# POPULAR AVIATION

*The Wingless Airplane Is Coming!* (page 17)

•

STOP TELLING THE PILOT WHAT TO DO – *Purcell*

•

*Early Adventures of Count Zeppelin* (page 21)

PUBLIC LIBRARY
FEB 10
DETROIT

TECHNOLOGY COPY

**Köhl Flying Wing**
See Page 32

**JANUARY 25¢**

HERMAN R. *Bolin*

XUM

# ★ The *New* FALCON ★

## 2 *Place* CABIN COUPE

"*The* ACE in AIRPLANE EXCELLENCE"

## A NEW AND ADVANCED TYPE OF TRANSPORTATION FOR EVERY INDIVIDUAL USE

The gratifying expressions of indorsement and the widespread display of confidence has far surpassed our highest predictions. No other light ship has been so universally accepted and acclaimed by the air-minded public. The New Falcon is indeed the outstanding engineering creation of the year!—its low price, smart appearance and the brilliancy of its performance consequent upon the excellence of its engineering. The New Falcon will whisk you and companion, effortlessly above the tedious slowness of present day traffic — along the miles — easily — swiftly and in absolute safety. Your pleasure of owning and operating a New Falcon (two-place cabin coupe) will be immeasurably heightened by its sureness and simplicity of control, the high rate of proven safety and its roomy cabin comfort. You are cordially invited to give the New Falcon your most serious investigation and consideration.

**$995**
(FLY-AWAY FACTORY)

## PLACE YOUR ORDER EARLY—DELIVERIES CAN BE MADE IN ROTATION ONLY!

ANYONE CAN QUICKLY LEARN TO OPERATE THE NEW FALCON SAFELY!

2 to 5 hours of free instruction from your dealer, or our own pilots will enable you to master this simple, new modern means of transportation.

***"If You Can Drive a Car - - You Can Fly the New FALCON."***

The New Falcon is a two-place Cabin Coupe with a 42 horsepower two cylinder air-cooled engine of our own make, gas consumption 3 gallons per hour, low speed 28 miles, top speed 85 miles, cruising speed 75 miles, with speed wing 98 miles per hour. Wing spread 36 feet, chord 50 inches, length 20 feet 6 inches, height 5 feet 8 inches. Steel hangar 10 feet by 24 feet manufactured for the Falcon, $150.00

**Optional Installation**

Continental A-40, 4 cylinder motor $200.00 additional.

## AIR-CRAFT CORPORATION OF AMERICA

**General Offices: Majestic Bldg.**
**INDIANAPOLIS, IND.**

• • •

**Factories: Portland, Ind.**

**DEALERS!** ***You Can Sell this Ship—***

**Attractive proposition with possibilities unlimited. We will outline plans which will bring you real profits! Exclusive sales franchise guaranteed. Write or wire today.**

**USE THIS COUPON** 1-32

AIR-CRAFT CORP. OF AMERICA
8th Floor—Majestic Building
Indianapolis, Indiana

Send details. I am interested as, ☐ Private Buyer ☐ Dealer

NAME .....

ADDRESS ..... STATE .....

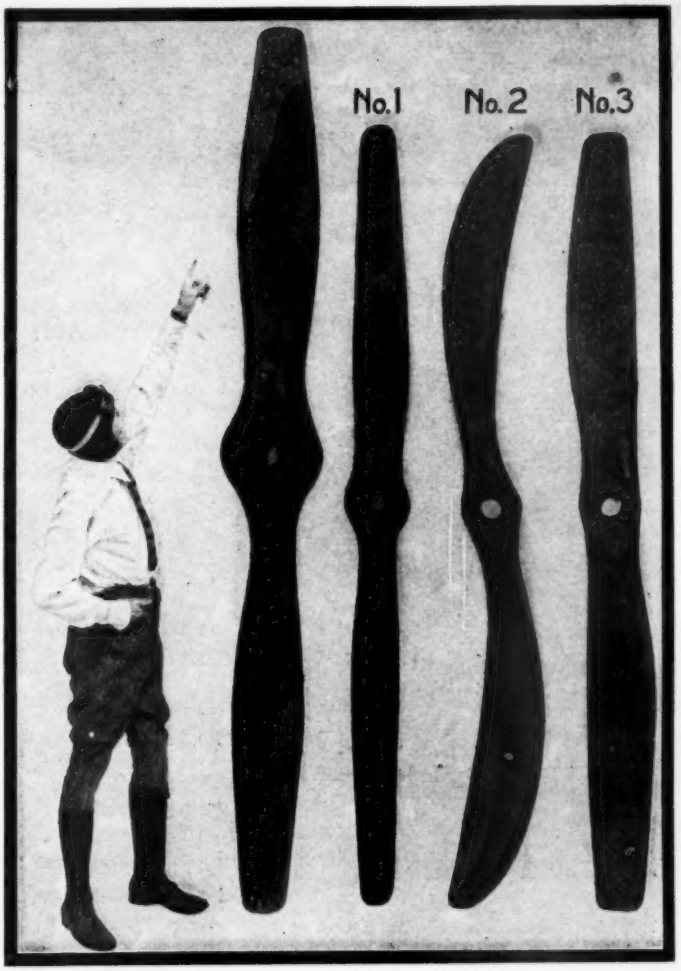
**IF YOU CAN DRIVE A CAR - - YOU CAN FLY THE NEW FALCON**

# REAL WORLD WAR PROPELLERS

*only* $1.98 *and up*

**I just located 500 war time propellers. The price was right. I bought. Now you can buy these real airplane propellers which are between 8 and 10 ft. long from tip to tip, as shown in the illustration at the right at the extraordinary low price of only $1.98 each and up.**

**Mount a clock in the centre! Hang them in the den! Put them over the fireplace! Be the first in your town to have one! A real ornament that becomes more valuable as time goes on. They won't last long. Act now!**




A few slightly shopworn or unvarnished propellers, 8 feet, 6 inches long, like No. 1, No. 2 or No. 3 are available while they last at $1.98 each. Either of these three styles of propellers in perfect condition, undamaged, can be had beautifully refinished and varnished with clear varnish for $2.98 each. The enormous Liberty propeller, almost 10 feet in diameter, to the top of which I am pointing is made of Walnut or Mahogany with copper tips, as illustrated, at $4.95 each.

## READ WHAT THEY SAY

Mr. Joel D. Barber, an architect of New York City, says: "Dear Mr. Ort: The Airplane propeller arrived safely on Saturday and I wish to thank you for your promptness in sending it. It is very satisfactory and I am sure it will be a very handsome addition to the room in which I plan to use it."

Mr. Mackelnay, Texas, says: "Thanks for the prop.. It arrived O. K. and every one is crazy about it."

Peter Rossiter, Mass., says: "Received prop today in perfect condition. It was far above my expectations and makes a dandy ornament."

Abadal is a guy who invented an airplane engine, and he comes first in Glenn Angle's 547 page Engine Encyclopedia which described 735 different kinds of engines and has over 500 pictures in it. Mr. Zeitlin's engine comes last and in between is the most interesting description of engines you ever saw.

This book used to cost $7.50. My price is now $2.98, postpaid anywhere in the United States, while they last.

I have lots of other aeronautical gadgets, and stuff like wheels, tires, tubes, engines, tubing, fabric, tape, bolts, nuts, turnbuckles, clocks for in the propellers, and such like, which I am selling mighty cheap.

***Pin Money Order or Dollar Bills to This Coupon and Mail Today. I'LL DO THE REST.***

KARL ORT, YORK, PA.

Dear Ort:

You bet I want a real "prop." Enclosed find $..... Send me right away.....propellers or book as checked below:

No. 1 ☐ No. 2 ☐ No. 3 ☐ Liberty ☐

Angle's Engine Encyclopedia ☐ Catalogue ☐

*Name*.....

*Street*.....

*City*.....*State*.....

These propellers are not represented as being serviceable for flying.

*Write your name and address on the coupon, send it to me today with a dime, and I'll mail you a copy of my latest catalog, hot off the press.*

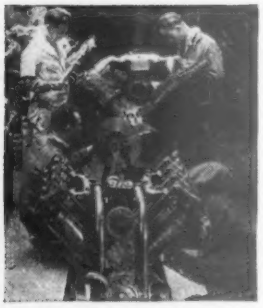
XUM

# Mechanic Today . . .

## Mechanics as Well as Pilots . . . Lincoln Graduates

Mechanic today—Executive tomorrow! That's the way it goes in Aviation! For Aviation—the world's fastest growing industry—offers opportunities never before known in the history of mankind. And pilots are not the only men who can work up in Aviation. Many of today's big Aviation executives were once Mechanics. You, too, start as a Mechanic, and work up into a big executive position!

But remember, Aviation offers you *only the opportunity. You must be a highly-skilled Mechanic to hold a responsible Mechanic's position.* You must have thorough, practical training before you can start on the upward route to Aviation's high-salaried executive positions.



Students Overhauling Engines

**Come to the Lincoln School** for the kind of training that assures success. Lincoln training is complete, thorough and practical—based on this school's 12 years' experience training young men for Aviation positions. Lincoln facilities are unequalled by any other school. No detail of training is overlooked. That's why Lincoln Mechanic as well as Pilot graduates get the best-paying, most responsible positions—and advance quicker!

**World's Best Known School—**Lincoln has produced so many successful men, this is now the best known Aviation School in the world. It is located in Lincoln—where Lindbergh took his first Aviation instruction. The fame of this school has spread to the far corners of the earth. Students have come here from China, Scotland, South Africa, Alaska, South America, Canada, Sweden, Holland, Germany, Ecuador, Central America, Hawaii and from nearly every state in the U. S.

Lincoln's $250,000 Mechanics' School

**LINCOLN**

**Airplane & Flying School**

**237A Aircraft Bldg. Lincoln, Nebr.**

**Government Approved . . . This School is Approved by the U. S. Dept. of Commerce as Private, Limited Commercial and Transport; both Ground and Flying School**

**En Espanol—**Ofrecemos enseñanza en Español en los cursos de Aviación que se enseñan en Este Colegio.

Esta Escuela está autorizada por el Gobierno de los EE. UU. para traer estudiantes del extranjero. Pida informes gratis.

A Group of Students at this School's $100,000 Modern Airport

**LEARN AVIATION AT LINCOLN. . . . . WHERE**

XUM

# Executive Tomorrow

## Work Up to Big Positions Have Best Opportunities

### GOOD PAY for Skilled Mechanics

The Aviation Mechanic seldom sees his name in the newspapers. Yet he is of tremendous importance! For upon him rests a great responsibility—that of building or keeping the planes airworthy. *He must be a highly-skilled Mechanic.* He must be responsible. And as a highly-skilled, responsible man, he earns Good Pay!

**Demand is Big** for properly-trained Mechanics. Think of it! There are 20 Mechanics' positions for every Pilot in the air. Come to Lincoln and train to become a Master Airplane and Engine Mechanic!

### FREE Aerial Radio Course!

A new feature of Lincoln training is a Special Course in Aerial Radio, regular tuition charge $100. **This Aerial Radio Training is given FREE to Lincoln students who enroll for any of our other regular courses within the next 30 days.**

### Unequalled Facilities

We have more extensive, practical facilities than any other civilian Aviation school in the U. S. Our Mechanics' School is connected with a large aircraft factory—we give you practical instruction, according to actual factory standards. We have $250,000 worth of buildings and equipment. A $100,000 modern airport. A large fleet of government-licensed training planes—including 4 distinct types. And seasoned, government-licensed instructors—who take a personal interest in every student.

**Complete Flying Courses** to qualify you for Private, Limited Commercial or Transport Pilot Licenses are given at Lincoln. Lincoln-trained Pilots, because they receive better training, get the best Pilot positions. Also complete, practical courses in **Aerial Radio** and **Welding.**

**Ground and Flying School hold Highest Government Approval. Are operated under Regular Supervision of U. S. Dept. of Commerce.**

**Part Time Employment** is offered students to help pay cost of room and board while training.

**Young women as well as men attend the Lincoln School. This is one of our women students.**

**D. Applebee**

"After graduation I immediately found a position in an aircraft factory which paid more at the beginning than did my former railroad job after five years."— D. Applebee.

**L. M. Schumaker**

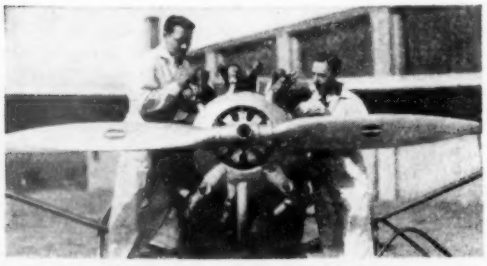
"I found your course to be very practical and instructors competent. After completing course, I immediately went to work for an aircraft factory."—L. M. Schumaker.

**C. L. Currier**

"My first job paid $300 per month. Now I earn $400. The most essential requirement in Aviation is training such as yours."—C. L. Currier.

**We Help You Find a Good Pay Position** after you graduate. Our Employment Dept. keeps in touch with airplane factories and airports throughout this country.

**Get Your Start TODAY!** The first step is to get the Lincoln Catalog. It's sent FREE—if you mean business. Mail Coupon for Catalog—NOW!



**Learning How a Whirlwind Operates**

LINDBERGH LEARNED

### CATALOG ON REQUEST

Contains complete information about Lincoln School. Lists reasonable tuition costs. Mail coupon today!

### MAIL THIS COUPON TODAY!

**LINCOLN AIRPLANE & FLYING SCHOOL**
237A Aircraft Bldg., Lincoln, Nebr.

Gentlemen: Please send me your catalog, "Aviation Beckons You," containing full information about the Lincoln School and reasonable tuition.

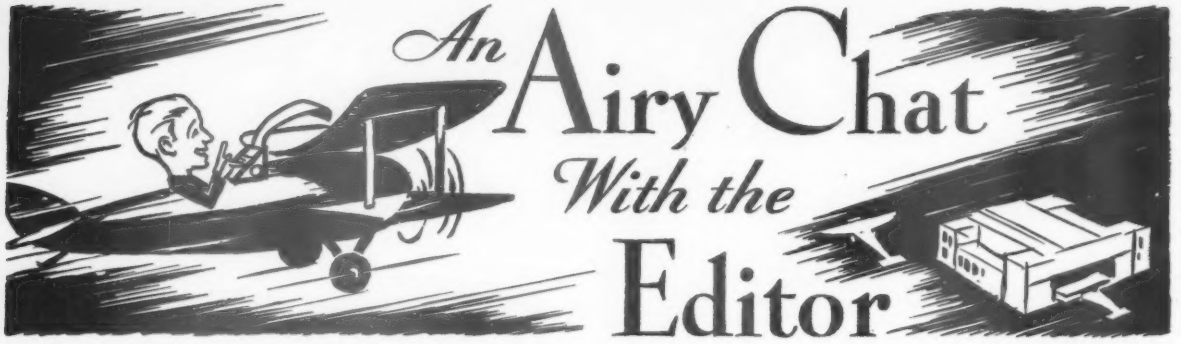
I am interested in:

☐ Mechanical Course ☐ Radio Course
☐ Flying Course ☐ Welding Course

Name..... Age.....

Address.....

City..... State.....



# An Airy Chat With the Editor

"TIME flies," which is a more or less appropriate quip for an aviation magazine. It seems that we hardly get used to writing 1931 until it changes to 1932. The ink hardly has time to dry on "Merry Christmas" of our last issue until fresh ink is being applied to the "Happy New Year" of this number.

We all look back on the past year with varied feelings, but most of us hope that the coming twelve months will give us more of a break than old 1931. Aviation as a whole, however, has not suffered so much from the financial conditions as other industries, and some branches even indicate a slight gain. Operators of air-lines, in general, did very well indeed, to judge from official statistical data.

Well, let's look into the future instead of moaning over the dead past. For one thing, if our reader correspondence increases very much in 1932, over what it has been in 1931, we'll have to install a lot of teletypes, or something, to keep our correspondence up to date. Every reader who had a bottle of ink and a pen, evidently used them. And the Question and Answer Department—Oh, Oh!

* * *

LET 1932 mark a year of progress in invention and design. Aviation sure needs it. I'm optimistic, notwithstanding disappointments in the past, but will predict that we will see some revolutionary changes in the airplane structure. Having had a respite from nickel and dollar collecting for some time, our worthy inventors have had a lot of time on their hands to do a little intensive thinking. And I wonder what this will bring forth?

* * *

HERE at the office, we think that we have a hot cover this month. In the first place, the design is striking. In the second place, it is produced by a different printing process that shows up the artwork to much better advantage than the old system. We hope you like it.

* * *

ONE way to get the dope from you fellows is for us to state that a certain thing is no good or that it can't be done, and immediately good letters start pouring in. In the past two issues, we have stepped pretty hard on Ford engine conversions—just in hope —and as a result, we have had about a dozen letters and photographs showing successful flivver outfits built and flown by our readers. Also, there is one Chevrolet entry, and possibly there'll be a little teeny-weeny ship with an Austin engine in it. Who knows?

* * *

TALKING about stepping on the gas, we have a feature article this month that we believe is sure going to start something. We only hope that we will have enough stamps to answer the flock of letters that is certain to follow the publication of "The Wingless Airplane is Coming." This is one of those controversial articles put up for debate, so horn right into it and tell us what you think—or don't think.

* * *

THEN, we have our wartime plane controversy raging, as usual. The Party of the First Part consists of ardent photo collectors. The Party of the Second Part doesn't think that there is much to this stuff, and had rather see the space devoted to modern ships. After a careful review of the letters, the wartime photo collectors outnumber the modernists above five to one. We don't care which way the battle goes, but we do wish to please you.

* * *

MODEL builders will certainly be enthusiastic when they see Joe Ott's new 358-page book on model airplanes—"Model Airplanes: Building and Flying"—just off the press. This is by far the best model airplane book that we have seen, both in the matter of the contents and in its general makeup.

The instructions are complete, and it is copiously illustrated with photographs and scale drawings of all sorts of models, far too numerous to mention here.

That Ott knows his stuff, you'll all agree, and he has more than turned himself loose in this volume. There are very many models that have never been published in POPULAR AVIATION and which will be new to you. The price is $2.50.

* * *

LOOKING at the pile of letters, we pick up one from a Canadian reader, Cecil B. Foster, 221 N. Mackenzie St., Sarnia, Ont. And now, let's listen to what Cecil says:

*The wartime section of aeroplanes is "hot," and I hope to see another installment soon. While I think about it, I might as well say that most American magazines spell AEROPLANE wrong. See that you don't slip.*

Well, personally, I'm strong for the original word "aeroplane," just as you are, Cecil. A benevolent section of the aircraft division hung the word "airplane" on us at about the same time that prohibition was handed out, and we have been suffering from a series of disjointed aeronautic words ever since. Just let any committee on nomenclature sit in conference for a "spell," and a wrecked language will be the certain result.

* * *

THEN comes a mighty interesting letter from H. Kenneth Bostead, formerly Corporal, Gunner and Observer, 1st C.M.M.G.B., Canadian Air Forces. Mr. Bostead very emphatically disagrees with Mr. McGrigor, and delivers himself just like this:

*I read something in the August issue, by a guy calling himself McGrigor, that I can not digest. He says he could keep on indefinitely telling of the exploits of aces such as Fonck Guynemer, Richthofen, Udet, only we might go to sleep.*

*If he only would have gone to sleep himself, before he started writing that bunch of junk, he would have saved a lot of us a pain in the neck. I would advise our friend McGrigor that if he is writing from information gained by reading magazines and newspapers, he ought to read them some more. Otherwise, unless he knows something of what he is talking about, he should not write about them at all.*

*For one thing, I beg to correct him. Bishop (then Major) is not and never was of the British but was one of the good old Canadians. And I might also correct him, that Major M. Cudden, V. C., simply had to fly through the German formation of 25 planes as he was cut off from his own lines, and that on his way through, he shot down four German planes, out of control.*

*I wish to say right here, that Colonel Rickenbacker did not bag his 25 or more planes while sleeping. I have personally seen Colonel Rickenbacker engage formations of more than eight*

(*Continued on page* 59)

XUM

# POPULAR AVIATION

A Magazine for the Promotion of Amateur Aviation and Private Flying

Volume X JANUARY, 1932 Number 1


## TABLE OF CONTENTS

### FEATURE ARTICLES


Airy Chat ..... 6
Archie Dodging Over Flanders ..... 8
Cracks Off Ice With Compressed Air ..... 12
Stop Telling the Pilot What to Do ..... 13
Seeks Government Aid in Training ..... 15
The Wingless Airplane is Coming ..... 16
Sensations in An Autogiro ..... 20
The Early Adventures of Count Zeppelin ..... 21
Famous Planes of the World War ..... 23
You Tell 'em—It was a Limping Lena ..... 25
What Our Readers Are Building ..... 27
Parachuting With Jimmie Donahue ..... 29
The Köhl Flying Wing Does Well ..... 32
Question and Answer Department ..... 33
Randolph Field Trains Beginners in Air Corps ..... 35
Practical Lessons in Flying ..... 37
The Round Robin Club ..... 40
New Ideas for Our Model Builders ..... 41
Landing and Take-Off Problems ..... 42
What We Learned From Crack-Ups ..... 43
Model Department—How to Build the Ansaldo ..... 44
Women's Activities ..... 48

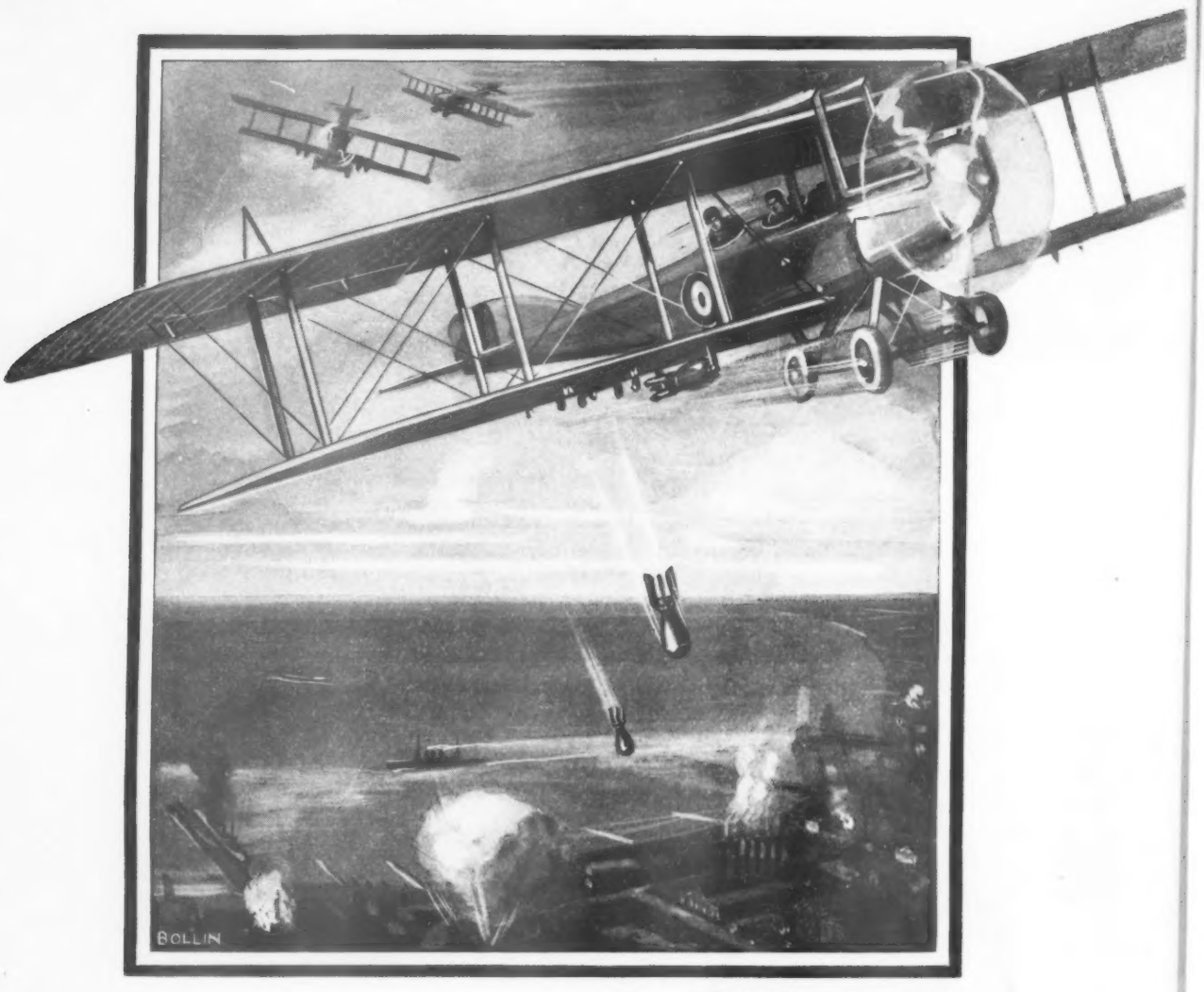

### THE PICK OF THE BRIEFS


A Reaction Type Helicopter ..... 11
Latest Army Pursuit Ships ..... 11
New Regulations for Those With Faulty Vision ..... 11
Robot Pilot Proves Successful ..... 14
The Balloon as a Schoolroom ..... 19
The Last Dog Fight In the War ..... 19
Emergency Landing Fields Are Important ..... 20
Lady Heath Becomes a Bride ..... 24
All About Tail Spins ..... 24
Falcon Tests Prove Successful ..... 26
Aeromarine AR-3 Lightplane Engine ..... 26
Bristol Fighter with Jupiter Engine ..... 28
New Stratosphere Plane Completed and on Test ..... 28
New Device Measures Human Fatigue ..... 30
Trimotor Plays Fire Engine ..... 31
Gatty Invents Ground-Speed Indicator ..... 35
Laying Down a Smoke Screen in Maneuvers ..... 36
Warplane Data Sheet for War Fans ..... 36
Shooting Antelope with a Camera ..... 39
A Revolutionary Parachute ..... 39
Progress of Aviation Insurance by Years ..... 39
Aerial Radio Control ..... 40



POPULAR AVIATION. Volume 10, Number 1. Published monthly by Aeronautical Publications, Inc., at 608 South Dearborn Street, Chicago, U. S. A. William B. Ziff, Publisher, B. G. Davis, Editor, John B. Rathbun, Managing Editor. New York Office, 551 Fifth Avenue, New York City. Subscription $2.50 per year; single copies, 25 cents; foreign postage, $1.00 per year extra. All contributions paid for at regular rates, but the publishers can not be responsible for the loss of any manuscripts or material submitted. Entered as second-class matter, June 16 1931, at the Post Office, Chicago, Ill., under the act of March 3, 1879.


XUM




Illustrated by Herman R. Bollin.

# Archie Dodging Over Flanders

*by* Lieut.
JOHN R. A. BARNES,
R. A. F.

*Formerly of the Royal Air Forces Bombing Squadron*

JERRY CAMPBELL, having left an English public school a few months previously, to serve his king and country, had been piling up flying time for the past ten days at a French "flying-pool." Since yesterday, having received his ticket from the pool, he stood awaiting the orders that would take him to the front.

And finally they were handed to him—attended with all of the thrills and misgivings that accompany such assignments. The official looking letter in his hand ordered him to join a "B" flight outfit, not far distant, headed by Flight-Commander Charles Sampson—an officer of renown in the Royal Air Forces. "Upon receiving this notice, proceed at once to Albert," read the slip.

Immediately calling a car, and waving a farewell to his erstwhile companions of the "pool," Jerry departed for the squadron designated on the orders. He was happy and elated to become a member of any squadron headed by such a man as Sampson, for what Englishman had not heard of him—but an apprehension of failure and the dread of not making good in such an illustrious outfit had subdued his enthusiasm considerably. It would have been better, he reasoned with himself, had he been attached to some mediocre squadron in a quiet sector until he had gained more confidence in himself.

SHORTLY, he arrived at his destination, and stepping out of the car he entered the squadron office. Then, while Adjutant Lieut. Davis checked his log book and history sheet, Jerry had a chance to look over the airdrome. It was not greatly to his liking, a field of postage stamp size and a sunken road straight across it. "Pretty tricky taking off," thought Jerry.

Field mechanics were putting new wings on a well battered ship—probably that would be his? Then—there were three empty hangars that called his attention—probably the flight was out on an afternoon party as this was a day bombing station.

Finally, Adjutant Lieut. Davis had completed checking the papers, and had joined Jerry. He had not talked to Jerry for more than a minute or so when a bedlam of noise and talking

announced the return of the party. "Well," asked Davis, "what sort of a show did you have this trip?"

"Oh—A lot of Archie—hot as usual—but no Huns up," replied Taylor, spokesman of the group. Taylor might have added more details, but did not, for he did not care to enter into remarks that might affect the newcomer. Any questions that might arise within Jerry's mind, thought Taylor, would be answered vividly enough for his comrade within the next twenty-four hours.

Just then a man of medium height stopped and joined the group. He was minus his tunic, collar and tie, and was wearing his cut-down lamb's wool flying boots. He was smoking a pipe in the most unconcerned fashion. Although hardly presentable, Jerry felt from the newcomer's manner that he was the man whom he had always longed to meet from his earliest days—Flight Commander Sampson.

* * *

CHARLES SAMPSON, Flight Commander Squadron, R. A. F., was born in Pittsburgh, U. S. A., and in 1915 had joined the Royal Naval Air Service in Canada. He had served in France long enough to rate a leave home and an instructor's job, but this he turned down. At an investiture at Buckingham Palace he had received the D. S. C.

"Campbell, this is Flight Commander Sampson," said Brennan.

"How d'you do, Campbell? 'B' Flight, I believe?"

"Yes, Sir," replied Campbell.

"It's no good my telling you not to 'Sir' me, because you will in spite of the devil.

"Had plenty of formation?" asked Sampson.

"Yes, Sir," replied Campbell.

"Well, here's dinner ready. Say, drop into my cabin tonight before you turn in. I may be able to put you wise to a few things."

Sampson felt the weight of his burden in these months which proved to be the last of the Great War. The lives of the fellows who flew behind him in those formations over the lines made this burden a heavy one. He went into the mess room and took his seat at table on the right of Squadron Commander S. R. Billings.

"Campbell, where did you train?" asked the Commanding Officer from the head of the table.

"Redcar, Sir," replied Campbell.

"Is Hudson still C. O. there?" continued Squadron Commander Billings.

"He was when I left, Sir."

"I instructed there for eighteen months," continued the C. O. "Good drome. None like that out here."

The conversation continued at a rapid pace throughout the meal; past experiences were alluded to frequently, and on rising after the toast to the King, Campbell wondered how far short he would come in handling this task

*Having accompanied Lieut. Arthur Heinsen, of the German Air Forces on an attack on London, in our last issue, we will now see the dispute from the other side of the fence. We now accompany the English on an air raid against a German submarine base.*

ahead of him. He had always suffered more or less from an inferiority complex and now he had a dull ache in the pit of his stomach.

* * *

IN THE anti-room his brother officers were choosing their evening diversions — some for bridge — some for poker — some for roulette — others awaited the car for Calais.

Seeing a table with writing paper on it, Campbell sat down and wrote a letter home. There was little he could say, for the censor put fellows on their honor. His thoughts were of his mother and sister as he scribbled. He began to realize for the first time just why they hadn't shared the thrill he experienced when he first donned the King's Uniform. He sealed the envelope, threw it in the mail box and made for Sampson's cabin.

He found Sampson stretched out on the bunk smoking a crooked pipe.

"Have a chair. There are some cigarettes on the table."

Campbell sat down and lighted one.

"How many hours have you?"

"About forty solo."

"Good. Formation is what counts out here. We are lost without it. If a man loses his position, he makes it tough on himself and everybody else. Petty Officer Smith will be your observer. He is one of the best we have—a conscientious warrior who signed for twelve years. As Brennan's bus is a washout, you will take 7904 on the dawn show. It was put back into commission this afternoon."

Campbell remembered having seen it in the hangar.

"You will be flying left at the back of the formation," continued Sampson. "If your engine isn't running up to scratch, fire a white light and turn back. It's better for you and everyone else if you do that." Sampson got up and went to his trunk, from which he took some photographs.

Going over to a map on the wall, he continued: "Here we are and here are the docks at Ostend. They are our show now. Right there is La Panne. That's where we pick up our escort of Sopwith Camel Pursuit Planes. They are a refreshing sight, believe me. Here is Nieuport and that's the line. You can't miss it. All this country is flooded.

"These pictures," turning from the map to the photographs in his hand, "are of the Basine du Chasse, Ostend, and right here is our target. We climb for height for about an hour before crossing the line. After passing Nieuport, the Archie gunfire starts. The shrapnel bursts above and its smoke is white. The high explosive for direct hits has a black smoke.

"If we are attacked by enemy aircraft, move around—don't be a still target. And, if in the fight I should fire a green light, break formation and look out for yourself. I always try to remember that the Hun who attacks me is probably just as scared as I am. It's just a thought and it may help you. How are you fixed for an outfit?"

* * *

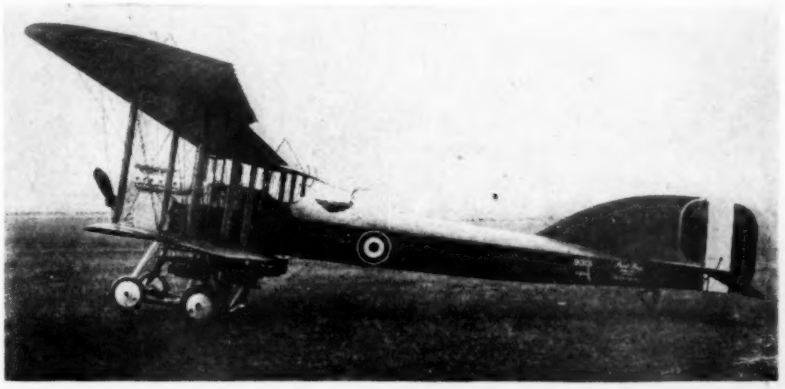
CAMPBELL replied that he had everything.

"Have you four pairs of silk gloves as well as leather gauntlets?"

"Yes, Sir."

"Don't put them all on on the ground. Put on a pair every two thousand feet—you won't feel the cold so much. And eat all you can before you start. I believe that is about all there is to tell you.

"Oh, by the way," Sampson referred again to the map, "Here is Holland. If you get winged, it is a good spot to make for. However, if you are doubtful of getting there, or back to our lines,



**A typical English light-bomber, the "Short" biplane, used successfully in raids during the latter part of the war. Note the great overhang of the wings and the long fuselage.**

head as far back of the German lines as you can. You stand a chance of better treatment there than you would in their trenches."

"What size bombs are we carrying?" asked Campbell.

"Twenty-five pound Coopers," replied Sampson. "They splinter on exploding, and with them we are endeavoring to prevent the repairing and assembling of submarines. We carry ten of 'em. If you turn for home with engine trouble, kick 'em off in the sea, but be sure there's nothing friendly around. Oh, one more thing. There's a sunken road across the drome (airport). Watch it when taking off and landing or you'll lose your undercarriage."

"Do we take off in formation?" inquired Campbell.

"No," replied Sampson, "we form formation on the drome, head into wind, and after the leader goes, first right and first left follow. Then second right and second left, and so on."

"Well," remarked Campbell, rising, "I think I'll turn in. Thanks awfully."

"You're welcome," said Sampson, opening the door. "Always remember that decorations aren't won by your leaving the formation to shoot down the whole German Air Force. Don't forget that I'll know where you are and will bust a gut to help you. You can help me by flying good formation. Good night, old man."

Campbell did not return to the anteroom, but went straight to his cabin and retired. He lay in his bunk and went over carefully many times the various points that Sampson had covered. He wondered about Smith, his observer. The fact that he was a noncommissioned officer appealed to him. Some of the lieutenant observers whom he had met this evening didn't look too conscientious.

* * *

IF HE could only hold his nerve so that Smith would have confidence in him. If the first trip were only over. What effect was gunfire going to have on him—and Hun planes? Well, they were man against man, but anti-aircraft guns were mechanical.

Campbell's meditations were interrupted by the entry of Taylor, who had returned from Calais and apparently was a little blotto.

"Well, old thing, how do you feel? You should have been with me tonight. Great time. Good old Maxine and his champagne cocktails at the Crystal Palace. You must meet old Maxine and Yvonne. Ah, Yvonne! Tomorrow night—what say?"

Campbell agreed. If only things turned out all right, he would agree to anything willingly.

"Excuse me, while I read this letter, old bean. It's from a little bit of fluff of Leicester Square. God bless her. Say, old man, if the Boche puts my name on one, see that only the right letters get back home—you know."

"You bet," replied Campbell. And he wondered if some time in the future, he would make a similar request of Taylor. Possibly even out here after awhile something would become a diversion.

Finally sleep overcame these boys, and while they slept, air mechanics over at the hangars ground the valves of the engines that were to carry them over the enemy lines at dawn.

* * *

"WAKEE!!! Wakee!!! Wakee!!! Show a leg!!! Show a leg!!!" The Duty Officer was coming down the corridor and cabin doors were slamming. When he entered No. 6 he found Campbell sitting up in bed, but he had to shake Taylor. It was still dark and Campbell felt as though he had had only ten minutes sleep. He jumped off his bunk onto the floor. Taylor was groaning and rubbing his eyes. Campbell dashed some cold water over his face and began putting on his clothes. They were about to leave the cabin when Taylor suggested that Campbell take along his uniform cap.

"It's a good thing to keep them in the cockpit with a tooth brush, razor and soap, old man. I have a couple of pounds of bar chocolate also. You never know, you know, when the old engine will conk and the Boches might not have dinner ready."

Half a dozen officers were seated at the breakfast table when Campbell and Taylor took their places. There was little conversation. Campbell remembered Sampson's advice, but his stomach rebelled against the food he forced down. He did his best to act as if he were enjoying it.

* * *

DAWN was just breaking as the gang started to the aerodrome. There was a chill in the air; seventeen machines were outside the hangars. Mechanics were running to and fro. A group of French peasants watched from the edge of the field—women with shawls over their heads and old men with their hands in their pockets. The propellers were being swung, causing a backfire here and there.

Campbell entered the mouth of the center hangar—that dull pain in the pit of his stomach chilled him. A man in a fur-lined teddy bear flying suit, swinging his helmet and goggles, approached him.

"Are you Lieut. Campbell?"

"Yes. You must be Smith."

"Yes, Sir."

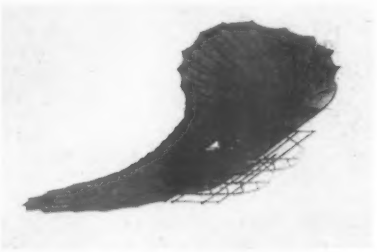
"I'm glad to meet you. You are an old hand at this game and I need any help you can give me."

"I'll do all I can," Smith assured him.

Campbell started to put on his flying suit—he liked that man. Smith handed him a life belt, saying, "We are over the water a lot, so always wear one of these. If you have to use it, just strike that lever there. It punctures a small cylinder of compressed air which inflates the belt."

*(Continued on page 49)*

## Another Tailless Glider



Herr Wele's tailless glider in flight.

HERE we have an Austrian tailless glider invented by Herr Wele. Stability is attained by sweeping the wing tips back of the main plane and then giving the tips a slight negative angle of incidence. It will be noted that heavy skids are employed to take up the landing shock. This type of glider is not altogether a new idea, for Igo Etrich constructed a very similar series of gliders and power airplanes before the War. In all of these ships, the negative angle of incidence at the wing tips was the controlling stability factor.

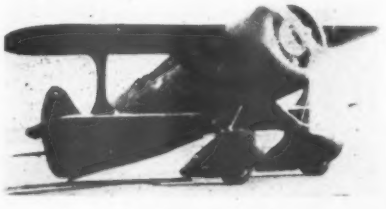
## The "Langley" to Patrol Arctic Region

THE Navy is sending the huge aircraft carrier Langley, together with its squadron of planes, into the North Atlantic on an Arctic patrol. This is the first time in aviation history that the carrier has ventured into the North for winter duty.

It is planned to put the men and equipment to a severe test under the extreme temperature. The Naval officials hope to gain much useful information on the result of ice and snow on the planes, on the flight deck and the arresting gear.

## Doolittle Sets up New Record

USING the biplane shown in the accompanying photograph, James H. Doolittle flew from Ottawa, Canada, to Mexico City in 13 hours, 36 minutes. As will be seen from the photograph, this biplane has an exceedingly short span and a very short compact fuselage. It will also be noted that it is of the single-strutter type, using a short "K" strut located at about one-third the distance from the tips of the wings.



She is small but speedy.

## New Regulation for Those with Faulty Vision

THOUSANDS of air enthusiasts who have been barred from flying because of minor defects of vision will now be allowed to take to the air as a result of a recent ruling of the Department of Commerce.

This new amendment to the regulations will permit licenses to be issued to persons whose eyesight has been corrected by glasses or specially constructed goggles.

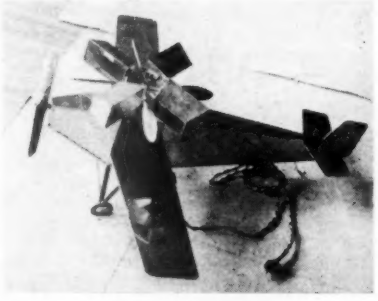
Since 1928, more than 5,000 persons have been disqualified for student and private pilot's licenses due to faulty vision. Thousands of others have refrained from taking the physical examination because of their eyesight, but in many instances the defect could have been easily corrected.

The new regulations provide that student and private pilot licenses may be issued to applicants otherwise physically normal, whose eyes, though subnormal, may be corrected by lenses to 20/30 vision or better in each eye.

The depth perception is not to be more than 30 millimeters while wearing the corrective glasses or goggles. But the Aeronautical Bureau will not issue licenses to those whose eyes fail to meet the present requirements.

To explain the fraction 20/30. This means that at a distance of 20 feet from the test card, that person can read what an individual with correct vision should be able to read at 30 feet. The term depth perception is the ability to judge distances accurately.

## A Reaction Type Helicopter

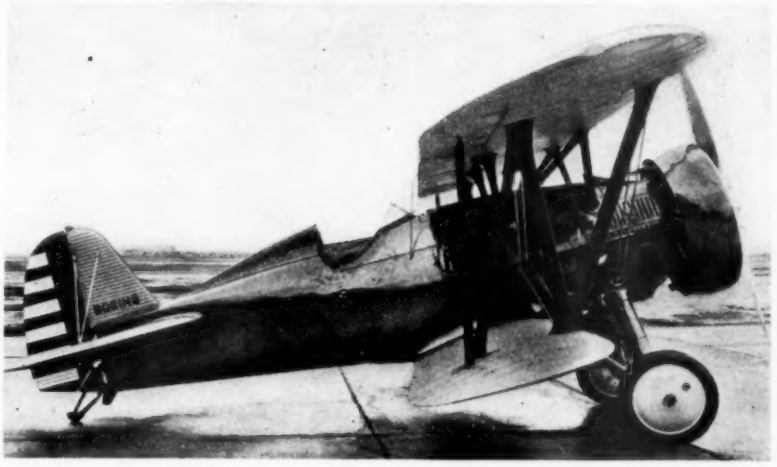


A new plani-Heilcopter.

AN unusual helicopter arrangement has recently been patented by Sandor Rosenberg and Jacob Hochman of New York. Instead of the rotating blades acting directly down on the air as with most helicopters, the rotor compresses the air in a series of open end boxes from which the air reacts and lifts the machine.

The box-like compressor chambers arranged radially around the rotor are clearly shown by the accompanying photograph. It will be noted that the compressor chambers surround the blades of the rotor, and that they taper down in area so as to increase the velocity of the discharged air.

## Latest Army Pursuit Ships by Boeing



Side view of the Boeing fighter. Note the excellent visibility.

THIS single-seater pursuit ship is the first of 135 Boeing fighting planes to be delivered to the Army Air Corps. The speedy little biplane is powered with a Pratt & Whitney Wasp engine, supercharged, which develops greater power at high altitudes than the standard Wasp engine.

Although performance data on this new ship is now being withheld, for military reasons, it is said to fly much faster than the 190 m.p.h. attained by the previous pursuit ships.

It has an all-metal monocoque fuselage of carefully streamlined outline, and is an exceptionally sturdy construction. It has an upper wing span of 30 feet, and is only 20 feet in length—overall.

## Pilot Handles Situation Well

A COMMERCIAL pilot with three women passengers took off from Lake Elsinore, California, recently for a ten minutes' sightseeing trip. The pilot failed to get sufficient height as he passed over a boat landing at the lake and the right side of the landing gear struck the top of the pier, the struts collapsing and the wheel dangling uselessly beneath the plane.

It would have been exceedingly dangerous to land on the beach and he kept right on climbing. He then decided to go to the Los Angeles airport as he knew it to be equipped for any emergency that might develop when he attempted to land.

Watchers on the ground saw the fix he was in and telephoned the Los Angeles port to be on the look out for him. He told his passengers but minimized the danger and said that he would give them a trip to Los Angeles instead of a ten minute jaunt around the lake.

Emergency equipment was ready when he reached the home field. He carefully maneuvered his ship so that the main force of his landing would be taken by his good left wheel. When the ship hit it started to nose over in front and toward the right and the propeller was badly smashed but the plane righted itself and came to a stop with all the passengers intact.

When the three women were taken out of the cabin they were found to be all right.

## The General Streamline Tire

A straight sided streamline tire.

AS the result of experiments conducted at Wright Field, a low-pressure tire of improved aerodynamic characteristics has been developed. The tire is of roughly triangular cross section when deflated, the rim being the base of the triangle and the tread is the point. When inflated, the triangle rounds out somewhat, but at no point is the tire wider than its rim. The wheel is faired in with the tire, making a very smooth assembly. Aerodynamically, it compares very favorably with the conventional type of wheel and tire fitted with streamline "spats." It also eliminates the weight and maintenance difficulties of the "spats."

## Cracks Ice Off With Compressed Air

+ + +

Right: Applying the rubber over-shoes to the wing.

Below: Protection applied to landing gear struts.

+ + +

EIGHT years of experimentation has culminated in the success of a set of rubber overshoes attached to the leading edge of an airplane wing. These are for the purpose of preventing the formation of ice during flight.

The experimenters originally set out to develop a chemical solution for impregnating the wing surface, but after several years of effort along this line, the idea was abandoned in favor of the rubber overshoe.

The "De-Icer" consists of a rubber shield attached to the leading edge of the plane's wing, and buried in this rubber is a set of tubes connected to a compressed air tank. This tank is filled by means of a compressor connected to the ship's motor.

Smaller shields are placed on the leading edge of the fin and stabilizers which are also connected by means of tubes to the air compressor.

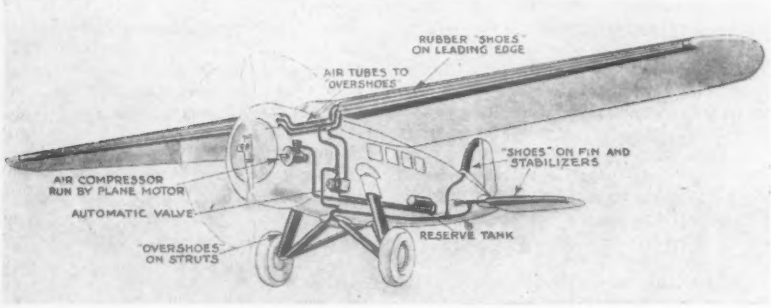
During flight, and after the formation of an ice layer on the wings, the compressed air is released from the tank. This tends to stretch the overshoes, and breaks the ice loose into small particles which are easily blown away by the force of the wind.

The De-Icer has proven to be eminently practicable in flight. A plane belonging to the National Air Transport was recently equipped with a set, and flown by William S. Brock for the purpose of determining the effect of the overshoes upon the ship's stability.

He found that there were no noticeable changes in the flight characteristics. In experimental flights, Pilot Brock deliberately chose heavy cloud formations with the idea of forming thick layers of ice upon the wings. The expanding overshoes easily broke the ice into particles which were brushed away by the force of the wind.

He later landed, after the formation of a particularly thick layer of ice which he carried to the ground with him. After the landing, the De-Icer was expanded and the particles of ice were blown away in the draft of the propeller.

The Miss Silvertown has been completely equipped with a set of the De-Icers.




**Diagramatic view of compressed air piping system.**

## Picks a Chicken Coop for Landing

A SPEEDY little monoplane, with an unlicensed airplane pilot spread terror over a little Southern California city recently and ended on top of a chicken house.

Two men from Long Beach rented a low-winged open-sport airplane. Up they went. For fifteen minutes they had a fine time. Six, of many witnesses, declare that the ship went hedge-hopping and roof-skipping across the top of the city.

Then something happened—even the occupants of the plane could not tell what. The ship and its two occupants landed, a bit unceremoniously, on top of a chicken coop in the outskirts of the city.

The chicken coop roof absorbed the shock along with the airplane, its pilot and passenger. The two scrambled out with only a few cuts and bruises. They will be charged with operating an airplane without license.

## Races Death in Plane

DR. L. S. LEO, physician and noted surgeon of Norfolk, Va., was the central figure recently in a record-smashing airplane race against death.

In a plane piloted by Lieut. Harold J. Skelley, Norfolk, he flew from Chicago, Ill., to the Virginia city in time to operate on a 9-year-old girl in a critical condition, making the flight in less than three hours.

Lieut. Skelley first flew from Norfolk to Chicago for the doctor, who had been at French Lick Springs, Ind., and who then flew from there to Chicago. The two then flew back to Norfolk, the flight out and the return flight being made in six hours. The operation was performed as soon as Dr. Leo arrived and was successful.

## Loudspeakers Instead of Bombs

THE Royal Air Force of Great Britain has introduced an unusual method of dealing with native uprisings in the lonely outposts of the Empire. No longer will the bombing planes drop death dealing "eggs." Instead, they will be equipped with an amplifying device whereby a human voice, speaking in a native tongue, will boom down from the sky like the voice of the Almighty.

The startled natives will stare up into the heavens to hear thunderous words warning them of the dangers in defying the British rule. The sound of the booming voice has an eerie effect on all who have heard it. The placid English officials who perfected it were even surprised at the volume of the amplifier.

The Ministry of Air feel that the "boomers" are more humane than the bombers, and that many a native revolt will be averted through the use of this voice from the sky.

# Stop Telling the Pilot What to Do

*by* CAPT. CHAS. W. PURCELL

If the airline superintendents stopped messing around with the radiophone there would be fewer accidents, says the Captain.

"HELLO! Airline—Oakland—Doe calling."

"Hello, Doe — Oakland. What'daya want."

"I think I have a fire on board," returned Pilot Doe who was flying through a thick sticky fog. He was just ten minutes out of his home field with passengers and mail when he had discovered the fire.

"Hold it," replied the radio man at Oakland. "I'll get you some orders."

"Hold your foot," said Pilot Doe, "I'm going to put down the first chance I get."

"Better not, Doe," replied the radio man, "section umpty-ump of the Company Rules and Regulation says you must wait for orders before landing your ship under these conditions."

* * *

FIVE minutes later the Pilot was ordered back to his own field and was told to be sure and bring the fire with him.

No, gentle reader this is not a bed-time story, but just one of those things that happen daily on some of our hungry airlines. No more does a pilot use his own head while flying his ship. Since radio entered the flying game, the above is usually the prologue or swan-song to a washout.

A lot of pot-bellied, fat-headed superintendents are trying to fly every ship on the line from their desks. From the window of their well heated offices, and with their anatomy planted in a nice big chair, they continually hand out orders to pilots who are flying through bum weather several hundred miles away.

The pilot may have a fire on board, he may have a short-circuit in some part of his ship, but nine times out of ten, his instruction will be to land at "the company's nearest field." The big idea is just this. If the pilot can get that disabled ship back to the home field the Super can "cover up." That is, the employees of the line can get to the ship and cover up anything that might result in some adverse publicity. If the pilot and passengers are killed well—that's just too bad.

These fat-heads think that all pilots are crazy, and—there'll always be passengers. All they want, is to have that ship back on the field where they can give out a story to the press that will, nine times out of ten, make a fool of the pilot. He was sick, he lost his way, or any one of thousand other reasons are given by these aforementioned fat-heads as the cause of the "washout." Dead men tell no tales, and as

A typical radio set at (R).

the pilot is usually very much dead, well—that's that.

The reader might think the pilot should do as he thinks best, and land the ship at the first opportunity. Oh My! Yes, of course, he should, but what would he use for money for the rest of his life? Pilots have a habit of eating three times a day. It takes money to eat and a job to make the money. His "job" would go bye-bye just as soon as he landed that ship, and he'd get another one about the time the author would be President of the United States.

AIRLINES today, are getting into the trust class fast, if not quicker, with the result that a pilot who is grounded by one company, is grounded by all of them. If he lands a ship under the above conditions they wouldn't even give him a job as janitor.

Before radio entered the flying game, it had a couple of wrecks every now and then. After radio entered, and the fat-heads realized what they could do with it, we have much bigger and better wrecks and a lot more of them.

These "chair flyers," as they are called by real pilots, are usually broken down pilots who are full of cockleburrs. The author could never understand why a pilot, who was worth his salt, would take four or five hundred a month and a title, when he could earn almost twice that much "hopping" passengers and mail.

Several incidents could be quoted here, giving names, dates and places, but the total results would only hurt the flying game and not the people who are directly responsible. The author doubts very much whether the higher-ups in the different air-lines understand conditions as they exist today, but he does think it's about time that someone put a bee in their ear. Airlines are having wrecks like nobody's business and someone must be paying the bills.

The Aeronautics Branch of the Department of Commerce could stop this condition with some good iron-clad regulations with teeth in them. Namely: *Any superintendent or radio man, who interferes in any way whatsoever with a pilot, should be fined and receive a few years in jail.*

The airline could be made to pay the fine and the Super could serve the jail sentence. Only with some real legislation can this condition be overcome.

A PILOT, with a ship in trouble and flying through fog, should not have to listen to the skitherings of a radio man. During an embarrassing moment, such as fog flying, he can use his own head with much better results.

By all the rules and regulations of the Department of Commerce, the pilot of a ship is in complete charge at all times but—as things are today—he is and he "ain't." The Department doesn't seem to realize the position that a pilot can find himself in respect to his "job."

Here's another angle.

A Mail Pilot's "run" is usually around three hundred miles. Day or night makes no difference. If he has to battle fog, rain and a head-wind, that makes no difference either. For the benefit of non-flyers, let the author state right here, that three hours of flying takes a lot from a man and he needs rest to get it back.

A pilot usually arrives at his destination thinking of a nice bed to do some "bunk fatigue" in. Yep! but he just thinks that. When he's ready to climb out of his ship, a radio greets him with the instructions to take the ship on to the next station. The Pilot, who was to carry-on, may be sick, and the already overworked pilot who has just arrived, takes the ship to the next station.

Then again:

A pilot has been in the air some two hours, and all that time he has

been battling conditions that would drive a man to marriage. He reports these conditions to the Super by radio. If the radio weather report of weather conditions at that spot, don't agree with the pilot's report, it's just too bad for the pilot and his report is consigned to the waste-paper basket. The Super will then probably turn to the nearest person, and tell him or her, that his pilots are full of horsefeathers or red ants.

About ten minutes later our pilot, who is still fighting fog, is ordered by the Super to "put down" at Hickville to pick up a passenger.

Now, he was close to Hickville when he sent in his report of weather conditions. Does his report make any difference? Not by your stars and garters it doesn't. The pilot knows just about where Hickville is, but in the fog he's tangled up with the exact location of the Field.

He is much safer where he is. His course is plotted out, and he is flying by Compass—so many minutes this way, so many that way. However, he must break out of the course and place himself and the passengers "on the spot" in order that the company may pick up a few more "kopecks."

He knows, that when he tries to "put down," it may be a total "washout," but it's a case of put her down or quit your job—and down she goes. In case he does washout in the "put down," the Super's Office will probably give out a statement that the "Pilot fell asleep at the stick" or "He probably became sick and lost control of the ship." This is the usual line of "hooey" handed out by these missing-links.

Before the Inspectors of the Department of Commerce get to the wreck, employees of the Company have received their instructions and have their little "bed time stories" all memorized. The Inspectors meet a lot of "I don't knows" in answer to their questions. If the Inspector happens to be a good detective, he might dig up the passengers and get the real facts of the case.

A lot of us have "climbed the frame" of the Department, time after time, but —when it comes to investigating a wreck, these bimbos are the only friend the pilot has. They don't take any of that old "hooey" about the pilot being sick. Nay, Nay, Pauline. They get the real facts of the case as a rule, but it can't be published.

ANOTHER funny thing is, that any one can try to cover up a wreck and lie about the cause of it. An inspector's work is just twice as hard because of the fact that the penalty for fabricating to him is—Nix. In other words, nothing. Somebody should put some "teeth" in that part of the regulations regarding the investigation of air accidents. A nice fat fine could be hung on any company whose employees

(*Continued on page* 62)

## Robot Pilot Proves Successful

Switching Automatic Control.

WITHOUT a pilot to guide her, except in taking off and landing, an eighteen-passenger plane flew about over the Newark, N. J., airport as a demonstration of the Sperry Gyroscopic Pilot.

This mechanism, weighing about 100 lbs., took full control in the air and guided the plane faultlessly. It is arranged, however, to be used interchangeably with the usual manual control, so that the pilot can take charge when desired.

Once the plane is in the air, the pilot sets it on its proper course and then throws a switch which puts the Robot in operation. After this is done, the ship requires no further attention so long as it is to maintain normal horizontal flight. A device of this sort relieves the pilot of much work during rough weather, and is of great assistance in fogs and clouds or under other conditions of blind flight. In the accompanying photograph, the test pilot, H. A. Elliott, is shown connecting the automatic control at the start of the flight.

## They Crashed it for Him

A DAREDEVIL pilot who failed to satisfy the crowd at a resort near Columbia, S. C., is minus his plane today. "Dusty" Barnard, the pilot, had signed a contract with the resort owner to crash his plane in view of the thousands of spectators who turned out. He took the plane up, but landed safely a few minutes later to replenish his gasoline supply.

While he was gone for fuel the angry crowd surged about the plane, ripped the covering from the wings and applied matches. All but the metal parts were destroyed. The sad part of it, from Barnard's point of view, is that he had intended to go up again and crash the plane.

## Holds Planes in Midair

ANOTHER device, for holding planes stationary while in midair, has been introduced to aircraft manufacturers. The invention is the result of ten years work and research on the part of Clayton B. Clark of Hammond, Indiana.

Air experts, who have examined the device, declare that it would be extremely valuable to endurance flyers and aviators making long distance flights. The basis of the invention is a group of six cups attached to the wing near the cockpit.

These cups receive air from a metal tube and reflect it on the back of the wings. This has a tendency to keep the pressure equal on both sides of the wings.

## An Air-Minded Snake

A FLYING school and airport mascot, that is both useful and ornamental, has been adopted by the Arrow Flying School. The mascot is a huge bullsnake named "Wash-Out," because of his lack of an undercarriage.

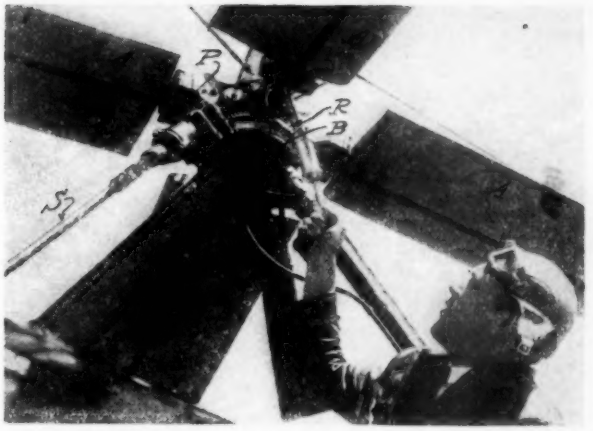
The snake, which is quite harmless despite its large size, is shown in the hands of James R. Lowell. It was captured last spring by Mr. Lowell, who is an amateur herpitologist as well as an aviation enthusiast. "Wash-Out" takes frequent flights in the planes used by the school and spends its spare time ridding the airport of pocket gophers.

During the summer, it was usually to be found around the hangar at one time or another during the day, and seemed to enjoy being picked up and stroked by persons with whom it was familiar. With cold weather coming on, "Wash-Out" is growing less active and will soon retire for the winter in its special quarters—an abandoned gopher hole near the hangar.

"Washout," the mascot snake of the Texas school—grounded.

# plane Is Coming Will It Be?

## ing various lifting surfaces and mechanisms




Mechanism of Autogiro. At (A) are the rotor blades; (B) are the bearings; (R) is the ring gear; (P) is the starting pinion, and (S) is the shaft.

"chord," or width of the wing, we will find that there is a sharply defined point at which the wing section balances at a given angle.

Point the wing down at the nose, and the center of pressure moves to the rear. Point the nose up, increasing the angle of attack, and the pressure center moves forward. If you can visualize this movement, you will quickly see that the center of pressure movement tends to aggravate conditions.

With some wings, the center of pressure movement is relatively small, while in others, it is very large. However, it always exists to some extent. Then again, if a wing section by any means displays a small center of pressure movement, then it will generally be very deficient in other respects.

A standard airplane wing always involves a lot of compromises. If we gain one advantage with a certain wing section, then we lose out somewhere else along the line.

There is no such thing as a "best wing section;" there can only be a best wing for some particular special purpose that the builder has in view. You trade one property for another property that you think is more desirable under the given conditions.

Then, in turn, comes the comparative lifting ability of a wing section. Some sections having a somewhat greater lifting effect at a given speed and angle of attack than others. The total lift depends upon the type of wing section upon the angle of attack to a much greater extent, upon the area of the wing and upon the speed to a still greater extent. The load carried per square foot of wing surface is a function of the section, speed and angle.

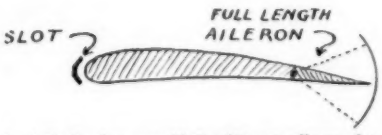
This relation gets everything all messed up when we try to vary the speed of the ship. To carry a load at low speed calls for a considerable number of square feet area, a high wing angle and a "high-lift" section. Now, if we wish to step on it, and do a little speeding—we are largely out of luck.

At a higher speed, the air pressure builds up so rapidly that we must promptly reduce the angle of attack to keep the ship from climbing. This calls for relatively more power when it continues down to a certain point. And finally, we get around the angle of "no-lift."

If we reduce the wing area, so as to get better flying conditions at high speed, then we get into more grief because there will not be sufficient lift to hold her up at low landing speeds. If the top speed is high, then the landing speed will also be high unless we introduce some corrective device.

Usually, the landing speed of a given wing section bears a definite relation to the high speed, all other conditions being equal. If, for example, the top speed is 100 m.p.h., then the landing speed will be in the nature of 40 m.p.h or about 0.4 of the top speed. You can't get away from it—it's built into the ship.

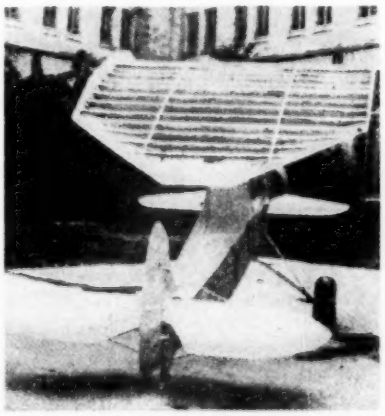
The load carried by the old Model "B" Wright ships was about 3.5 pounds per square foot, and the top speed was in the neighborhood of 45 m.p.h. On the other hand, the Schneider Cup racer had its wings loaded to 41.2 pounds per square foot and the top speed was 408.0 m.p.h.




A slotted wing provided with an aileron for increased effectiveness.

The difference in speed was largely due to differences in the loading per square foot. The Model "B" Wright landed at about 20 m.p.h., and I very much doubt whether the Super-marine could be landed much below 150 m.p.h.

Landing speeds, take-off speeds, cruising speeds and all the rest of the speeds are tied up with the wing loading—inflexibly with plain wings. A very large proportion of aviation accidents are due to high landing speeds, and it is about time that this sort of thing was remedied. Everyone likes to travel fast, that is one of the principal advantages of an airplane, but when this is attended with dangerously high landing speeds it is just too bad.



Rear view of Vacuplane shows the construction of the cellule. This consists of rods or slats.

When we talk of take-offs, which are again controlled by the wing loading, we run bump into another sad story. It is the story of unnecessarily large flying fields, the tremendous cost of upkeep for such fields and the ever present danger of cracking up when landing in small fields. If a high speed ship is used, then it requires a long run and clear surroundings unless an excessive amount of power is installed for a quick acceleration.

There have been a number of devices proposed for varying the speed, or rather for increasing the speed range. This development started out in antiquity, with a number of variable-camber wings by which the curvature of the surfaces could be varied to control the speed. When deeply arched, by a control mechanism, the wings gave heavy lift at low speed. When flattened out by the same controls, a good top speed was attained. Many inventors have contributed to this method from time to time.

Next comes the "wing reefing" system by which the area of the wings is varied in flight. For low speed take-offs, the full area of the extended wings is employed. When higher speed is desired, the area is contracted so that the loading and speed are correspondingly increased. A description of a Russian reefing wing ship was covered recently in POPULAR AVIATION. The wing tips of this monoplane slide in and out of the main wing.

While these inventions have a notable effect upon the speeds, yet they still fall short of the mark. Variable-area and variable-camber devices, at least so far, have threatened the strength of the wing structure and are therefore not desirable.

One very important improvement on wing construction, and one that has proved very practicable in service, is the "slotted wing" invented by Handley-Page. This device very materially increases the speed range of a ship by varying the lift, and by allowing higher angles of attack than possible with a plain wing.

Essentially, this invention consists of a metal guide placed along the entering edge of the wing. This so controls the flow of air over the top surface of the wing that the air does not break away from the wing or "burble" until very high angles of attack are attained. The slots are controlled automatically or manually, depending upon conditions.

However, it has been discovered that the wing "slots" are much more effective if an aileron is installed along the whole length of the trailing edge. At high angles, this hinged rear flap is depressed, and by this means even a greater lift is obtained at low speeds than with the slots alone. The writer has witnessed a ship of this type taking off and landing easily inside of a 100 foot circle. In a 15 m.p.h. breeze it hovered directly over one spot.

Handley-Page also instituted another innovation in wing construction which departs entirely from the standard wing. Essentially, it consists of a series of short streamline blades built into a unit, much after the manner of a Venetian blind or lattice. Each of these streamline blades is placed progressively at a flatter angle as we approach the trailing edge of the structure, and in this way, the whole area of the wing is utilized effectively.

Next, in the development of wingless wings, is the cellule construction of the "Vacuplane," described in the November issue of POPULAR AVIATION. This, it will be remembered, consisted of a short stubby cell carried over the fuselage, the upper surface of the cell consisting of rods or slats. It is claimed that this arrangement so greatly decreases the pressure on the top of the cell that a very much greater speed range is obtained.

Helicopters, of some sort or other, have always been with us. Few of them have shown much indication of success until the coming of the Autogiro, which in general, belongs to the helicopter family. Helicopters, or machines equipped with lifting propellers, look nice on paper but they have more inherent defects than wings. True, they have the advantage of landing and taking off at near zero speed, but they are mechanically complicated.

The Stauffer "Gyroplane," showing the single blade rotor which turns only on landing or take-off.

We only look at their one advantage, that is of slow landing, but fail to see at the same time that their top speed is limited. When we simmer the whole thing down into a nutshell, the speed range is not much greater, and usually less than an airplane.

In the point of low landing speed, a helicopter or lifting screw type has little advantage over an equally standard loaded wing, and still less advantage over a slotted wing type. The Autogiro, for example, has a top speed of about 100 m.p.h. but with the same top speed and loading, an airplane can land nearly as slowly.

Now, a helicopter type known as the Gyroplane, has recently been developed. It is apparently based upon a more logical principle than those that have gone before it. This is a combination of an airplane and helicopter, with the rotor used as an auxiliary to the wing.

When taking off, flying at slow horizonal speed, or in landing, the lifting propeller revolves and assists the wings. However, when the plane is to fly at high speed, the lifting propeller or rotor is stopped so that flight is now maintained by the wings alone.

Thus, if the wings are of the high speed type, this gives a tremendous speed range. It has a good gliding angle with a dead engine. This ship will probably range from a low speed of 15 m.p.h. to a high speed of about 145 m.p.h.

And now we get down to the so-called "rotor" or cylinder type of lift, which as you probably know, consists of a large diameter rotating cylinder projecting out on both sides of the fuselage. When the rotors are not turning, the air-stream splits equally around the cylinders and there is no lifting force exerted.

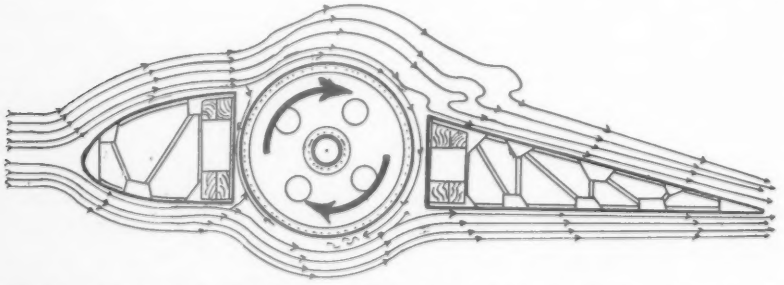
However, when the cylinders revolve the air-stream is twisted about in such a way that the pressure is higher on one side of the cylinder than on the other, thus producing the lift. Very little power is required to produce the rotation, and the cylinders can either be driven directly by the engine or else through the action of the wind-stream. A small amount of cylinder surface produces a remarkable amount of lift.

Now, this plain rotor is entirely ineffective when the engine stops, hence the machine will drop suddenly as soon as the engine cuts out. To avoid this difficulty, it is safest to combine the rotor with a wing in such a way that the wing will always be available alone for dead engine landings or high speed operation.

One experimenter, Mr. Ray Thompson, who has recently come into our notice, has designed a new application of the rotor and wing. He has done quite a bit of experimenting with large models and has obtained quite remarkable results. This general class of lifting device, in my opinion, is the first step in the complete elimination of wings—far more practical than any possible helicopter arrangemeht. We hereby quote from a letter by Mr. Thompson on the subject:

*"The rotor wing model had a span of 38 inches and a length of 42 inches, with a wing area of 360 square inches. With the rotors turning, it carried a load of 9.5 pounds to a height of 18 feet, the rotor being driven by an electric motor. This model had no propeller for pulling it forward, but was*

(*Continued on page* 58)



The Thompson Rotor-wing with the rotor imbedded in a deep wing section. Lines show air distribution.

## The Balloon as a Schoolroom

THE next time you see an airship, whether a small "blimp" or a giant Zeppelin, imagine it without motors or steering equipment. It would then be nothing more than a "free-balloon," perhaps a little inefficient in such a role because of its shape.

In the flying of an airship, it often must be handled as a free balloon—a gas bag that can be directly controlled only in an up and down direction. Its horizontal movement then depends on the air currents. Therefore, every airship or dirigible pilot, before he can call himself such, must first qualify as a free balloonist.

The small spherical training balloon is his first aerial classroom. By being trained in this way, he becomes familiar with certain whims of the giant motored gas bags that he will eventually fly, before he actually flies them.

At Akron, Ohio, the Goodyear-Zeppelin Corp. is training men for piloting the huge rigid air-liners that are to be built within the next few years and operated on commercial routes.

In this airship school, the student first becomes a free balloon pilot before he is permitted to continue his

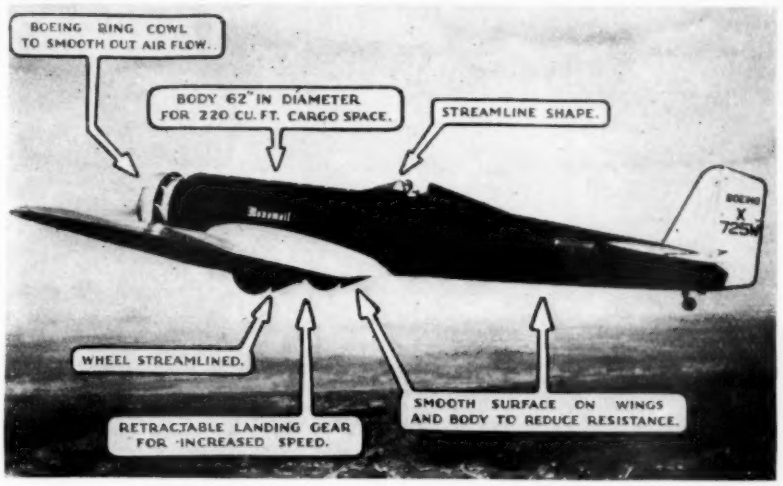
A school balloon with shadow of blimp overhead.

training in the small non-rigid airships or "blimps." In the balloon, he gets his first flight experience, learns to use navigation instruments, how to find his position by radio compass, to interpret weather conditions and so on.

The other field in which the free balloon excels is that of sport. Everyone is familiar with the two major balloon events of the year, the National and International races.

Even in such contests, the thrill of matching one's wits against the elements, and the other contestants, is not the only benefit derived by competitors. Usually, something new about air navigation is learned.

## Head Resistance is Reduced on New Boeing Transport


BOEING RING COWL TO SMOOTH OUT AIR FLOW.
BODY 62" IN DIAMETER FOR 220 CU. FT. CARGO SPACE.
STREAMLINE SHAPE.
WHEEL STREAMLINED.
RETRACTABLE LANDING GEAR FOR INCREASED SPEED.
SMOOTH SURFACE ON WINGS AND BODY TO REDUCE RESISTANCE.

Notes and arrows show the various refinements.

A HIGHLY efficient all metal monoplane has recently been designed by Boeing for transport service. This ship is said to carry the heaviest payload at the highest cruising speed of any single engine transport plane built today. The payload is 2,300 lbs. while the cruising speed is 130 m.p.h.

The accompanying photograph shows very clearly how these results were obtained by the reduction of head resistance. A retractible landing gear does away with much of the head resistance in flight while the wheels themselves, projecting below the body, are effectively streamlined by cone shaped fairings.

This contrasts with the conventional type of transport plane where many structural members are usually placed in the windstream. The monoplane shown is equipped with a Pratt & Whitney Hornet engine. The ship is now in service on the transcontinental route of the United Air Line.

## The Last Dog Fight in the War

IT was not until the morning of March 6, 1918, exactly eleven months after war had been declared on Germany, that members of an all American squadron made their first flight over enemy territory.

From then on, until the whistle blew, the Americans turned in a score of 927 downed planes and balloons in comparison to the 316 of the enemy.

The boys of Uncle Sam not only chalked up the most victories, although the betting odds would have favored the hardened "Aces" of the Fatherland, but they also had the honor of rolling down the curtain on that death dealing game of chasing tails.

As far as it has been possible to determine, Major Maxwell Kirby who is at present stationed at Luke Field, Honolulu, Hawaiian Territory, won the final air combat of the World War. He destroyed a Fokker at 10:50 on the morning previous to the day on which the Armistice was signed.

Two days before the white sheet had been officially hoisted by the Germans, four flyers from the 94th Pursuit Squadron had convinced their commanding officer that one of those chubby swaying bags back of the Meuse should not be there.

Although it was not raining at the time, the atmosphere was murky, a fairly stiff wind was blowing and the heavily laden clouds were attempting to get close up to the earth. It was evident, that under such conditions, it was inadvisable to make any flights.

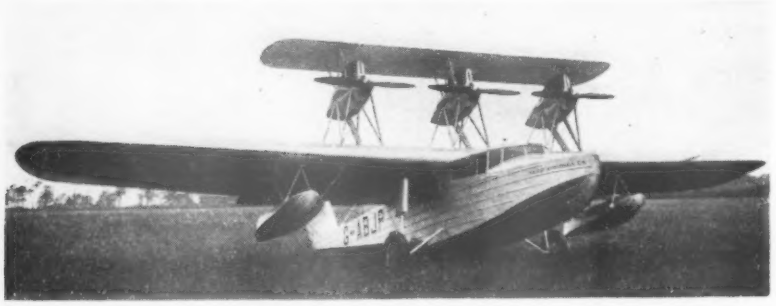
The argument in favor of a trip over the lines had been so convincingly presented, that permission was granted to go above despite the unfavorable circumstances. Major Kirby, who had not yet made a hop over the enemy territory, but desired such a hot time experience, was included in the small group.

None returned during that disagreeable night, and fear was expressed for their safety. On the following day one of them returned in good order, another had lost part of his prop and landed on the American side, while a third had crashed but was uninjured. Kirby, however, had been lost in the fog on the previous day and set down at the first available spot.

According to the official records, this is what happened: "In the region of Naucourt at about 10 h 50, when emerging from a low cloud bank, I suddenly came upon a Fokker monoplane at an altitude of 50 meters. I fired a burst into him at very close range (18 meters) and pulled away. He went down into the side of a hill and crashed."

XUM

## An English Amphibian—The Saro Windhover



The peculiar construction of the "Saro-Windhover," an inverted sesquiplane.

AN English amphibian, known as the Saro "Windhover," is shown in the accompanying photograph. It will be noted that this wing arrangement is quite novel, being in effect a sort of an inverted sesquiplane.

The main large wing is attached to the body in the usual manner, but the small wing placed above the three engines affords a means of gaining additional lift and increased stability. At the same time, the top wing streamlines such structural members as may be necessary for strengthening the engine support.

## Flight Sensations in an Autogiro

FRANKLY, it must be admitted that it is a queer sensation to fly in an Autogiro. So far, only a comparatively few Americans have gone aloft in the new air-cooled sensation in factory flights. But before this next season reaches its curtain call, hundreds and even thousands will have taken the air in Juan de Cierva's pride.

There are no nicknames for the craft. One sits a little higher in it than in the average three-place open-cockpit ship, it taxies the same and it responds to the same control movements.

But let us go back to when we went sailing into the windy air from the Boston Airport. Two curious passengers were taxied to the end of the runway and they gave a quizzical glance to the rear at Captain Julian Dexter, who flashed back a reassuring smile.

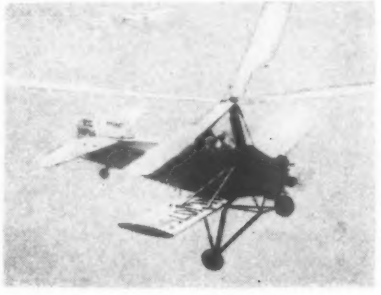
Dexter released the rotor clutch, and the four horizontal blades began their dizzy rotary spin. After the blades were swinging to the pilot's satisfaction, we looked up at them spinning away at their 126 revolutions per minute. We were told that they turn at that same speed in either a power dive or at the end of a vertical landing.

Before we could say "whisper," Dexter had the powerful motor wide open and we were hurtling across the cinder carpet at beaucoup miles per hour. Before it seemed possible, the craft pointed its nose skyward and we were off. It was only a run of a few feet, and up above, the rotor was ticking off its same 126 r.p.m.

Over the airport floodlight at the northern extremity in a steep climbing left turn, that would have made a pilot in the average plane a little sick at heart. My mind reflected back to the parachute I had just discarded before climbing aboard.

This was flying with a sense of safety—swinging high above the ferry boats with a real thrill of reality. Once again it seemed like just another open-place job, until I casually looked down at the small false wing, which really gives only 20 per cent of the lifting force.

Two left banks in succession were followed by three to the right. Talk about seeing the town sideways. The inevitable smile was still on the face of my fellow passenger, thrilled with the same sensation that I had just learned to enjoy.



An Autogiro in flight.

The excavation work in Postoffice Square was not very inviting, but probably would be possible for a landing that the three of us could walk away from. The roof of the Motor Mart Garage now looked larger than ever, and so did some sections of the Hotel Statler roof. The Public Service Building stuck out like a sore thumb, with its smooth roof neatly outlined like runways. Land there, perhaps?

Swinging high across South Boston, City Point looked like the Sahara Dessert and the roof of the Army Base re-

(*Continued on page* 48)

## Emergency Landing Fields Are Important

A FEW weeks ago, a big airplane bound east from San Francisco ran into a severe electrical storm. The pilot circled a landing field, outlined by its border lights, but scarcely visible through the driving rain. It looked to him like a lake and he wondered whether or not he could land.

He tried to radio in to the light-keeper below him but static interfered. He found, however, that he could raise Cheyenne, Wyo., some 600 miles to the east, so he asked the Cheyenne operator to call this mountain station, on the wired teletype system, and ask the keeper if the field was safe below its lake of rain.

The pilot watched as he circled and a few minutes later he saw a lantern bobbing about over the landing field while the keeper was making his survey. The lantern then disappeared, and two minutes later, the radio message flashed through the storm all the way from Cheyenne: "O. K. Go in and land."

That keeper, who earns $1,200 a year plus his housing, and his airport which costs the government four dollars a year or less per acre for the lease, thus provided a safe harbor for an airplane worth $60,000, two pilots and 16 passengers.

The Department of Commerce, Aeronautics Branch, has installed 351 of these intermediate fields. They are in charge of an army of trained experts who work 12 hours a day to keep the air safe for travel. These lighthouse keepers, in mountains and deserts, see no one but the pilot and passengers of an occasional plane that drops to their lonely stations during a storm or to make repairs.

The keepers work 365 days a year, minus a month's leave, and in some stations, see no one save their relief observer for six months in the year. Luckier ones get to a town once in two weeks or a month for provisions. In the high Sierras, in the burning heat of Death Valley, in the wind-swept crags of the Rockies and the steppes of Wyoming, they live and work.

But the keepers are not like the traditional lighthouse guardians. The lightkeeper of the airways is a busy man. He must be a weather observer; he must have a train despatcher's training. He is an airport operator, an electrician, a radio mechanic and operator, and on rare occasions is a host to wayfarers of the air. Every hour he sends a weather report to the nearest terminal.

Although the government is planning economy in all departments for next year, these valuable fields with their beacons will not be affected. Their value has been proved so frequently that the investment is considered by the Department of Commerce as one of the best that the government ever has made.

# THE EARLY ADVENTURES OF COUNT ZEPPELIN

*by* MILTON ADLER

*The dramatic biography of Count Zeppelin and the history of the ship bearing his name. This story tells how grit finally triumphed—*

THE day was fair, and the wind was little more than a breeze. A group of men had gathered about a balloon that was being inflated.

"Everything ready?"

"Yes, sir; go ahead."

A youthful Geman—a soldier in the Union army—climbed into the basket, and a few minutes later was enjoying his first flight in a captive balloon.

And so, at St. Paul, Minnesota, durin the hectic days of the American Civil War, begins the story of the rigid airship—known the world over as the "Zeppelin." It has been a leading figure in man's conquest of the air for over a quarter of a century.

Count Ferdinand von Zeppelin, many years later, declared that this first balloon trip and the several other ones he made during his services with the Union army, gave him the idea that a gas bag, if provided with means for propelling and steering it through the air, would become at once a new and valuable device for transporting men and goods.

BUT why do we find a German youth, recently graduated from his country's best military schools, playing with balloons in the midst of a great conflict on foreign soil?

The answer is simple, made so in the light of young Zeppelin's personality. He craved excitement which he could not find in the routine drills, inspections and other duties of a soldier on garrison service in his home land. So he became a soldier of fortune, and came to America in search of excitement. He found it. But, more important, he found an idea—one that eventually gave the world its giant air liners of today.

Zeppelin was born in 1838, in a building that formerly was a monastery on an island in Lake Constance, Baden, Germany. His parents decided on a military career for him and so he attended the Stuttgart Polytechnikum, the military school at Ludwigsbourg, and finally the University of Tubingen. In 1858 he became a cavalry officer—a lieutenant—in the Wurttemberg army.

But this particular young cavalry officer found difficulty in satisfying his great thirst for excitement. He was fearful that life would become monotonous. However, across the Atlantic two divisions of a nation were trying to settle the slavery question with guns. Where there is a war there must be some excitement, young Zeppelin reasoned. Therefore he went to America, and cast his lot with the Union army, becoming attached to the Balloon Corps which was little more than an experimental affair.

The first Zeppelin over its dock on Lake Constance.

EVEN the Confederate army failed to provide him with enough adventure, so he went on numerous hunting expeditions into the region of the Mississippi Valley which, in his letters home, he described as a "wilderness."

Count Zeppelin as he appeared during the experimental period.

These hunting trips, coupled with the balloon ascensions, led Zeppelin to remark that hunting would be easier if it were possible to use a balloon that could be steered. Then the hunter could go to remote sections where game is abundant, without the necessity of wading swamps, falling into creeks, and forcing his way through dense underbrush. It might even be possible to explore distant lands, if such a craft were large enough. But that's as far as he got with his reasoning for the time being.

Three years of adventuring in America, and young Zeppelin returned to Germany where he found more military work to do. He served with the Wurttemberg troops against Prussia. Four years later, his government seems to have undergone a change of view, for we find Zeppelin enlisted on the side of the united Wurttemberg and Prussian people against France. During this period of war he successfully carried out many dangerous missions of reconnoitering. He was present at the siege of Paris—a high spot in the campaign.

At the siege of Paris, an incident occurred that recalled to Zeppelin's mind his early dreams of air conquest by controllable airships. All other forms of transport being cut off, Parisians resorted to balloons for sending messages from the city. Zeppelin watched these flights with interest. But doubtless he needed no such demonstrations to convince him further that balloons ought to be improved.

FOR the next two decades this man, who was to introduce the world to a new mode of travel, continued to be more or less engaged in military activities. But he no longer was the dashing young army lieutenant who craved excitement. He was still extremely active and energetic, but he doubtless felt that he had had enough of adventure —at least of the military type. Besides, his dream of giant airliners was becoming something of an obsession.

So in 1891, at the age of 53 years and with the rank of lieutenant-general, Zeppelin retired from military service, determined to devote his efforts to development of his airship. Little did he dream that he was just embarking upon the period of his greatest adventures—far more thrilling than any he had experienced as a fighter or a hunter.

Prior to his retirement he had not been idle. In the hours that were not taken up with military duties, or with tasks connected with his three-year service as a member of the Bundesrath for Wurttemberg, he had been inventing and mentally improving airships. As early as 1873, he completed designs for a ship which had a rigid frame and with a gas compartment divided into individual cells. Fourteen years later, he submitted his plans to the king of Wurttemberg but the results that he had hoped for were not forthcoming.

"Ah, now I really can do something," we can imagine him saying after he had freed himself from his military and political responsibilities. He set to work, assisted by an engineer named Kober. Three years later, at the age of 56, he had completed plans for a rigid airship which was not basically different from the giant U. S. S. AKRON, that has recently been built for the United States Navy.

Not long after the plans were finished, Zeppelin, a man who was beginning to get old, waited without visible anxiety while a group of leading scientists studied his designs with scientific thoroughness. If they said, "yes," his success was within sight. But if their decision was negative—then his burdens and anxiety would be multiplied.

IT TURNED out that they said neither yes nor no. True, they could not find a thing wrong with the airship plans and specifications, but still they thought the project "not reasonably possible." In other words, Zeppelin was on the right track, but his station was not yet in sight.

A weaker man would have given up and gone back to soldiering, if there was still a place for him, especially if such a defeat had come at the wrong end of life. But not Zeppelin.

With a muttered "Ach!", he stowed his precious plans away and set out on another campaign. But this was not a movement against an enemy who might provide a little excitement. It was a battle to raise enough money to build an airship, regardless of what the leading scientists said. That airship just had to be built.

During the war, while the dirigible was above the clouds, an observer was lowered by a rope.

And it was. During the next four years Zeppelin organized a company and, unaided, sold enough stock to raise $238,000. That was not much but it would serve as a start.

To make matters worse, a group of experimenters with whom Zeppelin was not associated, constructed and launched a rigid airship similar to the one he had in mind except that it was metal covered. On its first flight it was compelled to land because of defective engines, and in doing so, folded up like a crushed egg. Its metal framework was too weak.

Zeppelin had long before pointed out that he did not originate the rigid airship idea, but he did claim that he had worked out many improvements in design.

"Airships are not practical," the public decided, following the wreck, and condemned forthwith any and all plans to build more such contraptions—Zeppelin's included.

BUT his usual persistence won out, and in 1898 he was ready to begin construction, even though his capital of a million marks was none too large.

"Handling an airship, while it is being launched or landed, requires a large unobstructed area and flying the ship requires extensive knowledge of the weather," he pointed out to his associates. "We must find a place that meets such requirements."

But the selection of a site for building the first improved rigid airship was not difficult. Really, there was but one place in mind—and the one which Zeppelin knew best—just as every man knows the scenes of his boyhood activities. Therefore, on the waters of Lake Constance near his birthplace, he erected the world's first rigid airship hangar.

He knew that the wind at this place was often of gale-like proportions, and he realized that the knowledge of handling a giant airship under such conditions was so meager that all precautions must be taken.

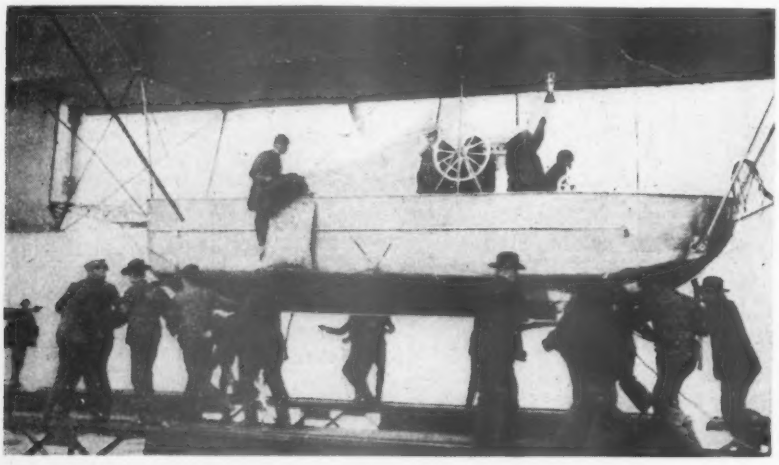
So the first hangar was erected on the most level surface in the region—the waters of Lake Constance. It was supported by pontoons, and the first Zeppelin airship, the LZ-1 (Luftschiff Zeppelin 1), was built to be launched from a platform on the water.

Zeppelin obtained world-wide publicity merely by building his airship shed. The structure was 500 feet long, 80 feet wide and 70 feet high. Eleven windows on each side admitted light. Offices, sleeping quarters, and storerooms were at one end. The whole affair was supported on 95 pontoons. The inside floor, on which the ship was to be assembled, was separate from the buildings and could be towed out into the lake on its own pontoons. The shed was anchored at one end only, so that it could swing in the wind, thus keeping the mouth always on the leeward side.

At first, the hangar broke from its moorings several times and was nearly wrecked on shore. Then, a 4½ ton concrete block and two ship's anchors were attached to one end with two emergency anchors placed at the other extremity. The tendency of the building to travel was thus removed.

THIS birthplace, of the long line of Zeppelin airships, was regarded as a monster in its day. But compare it with the new giant airship factory

(*Continued on page* 50)



The gondola of an early Zeppelin, with handling-crew making ready for an ascent. It is "weighing off."

# Famous Planes of the World War

## *Six More Unusual Photographs for Your Album*

## *"A Flock of Fokkers"*

A late model Fokker monoplane with a semi-cantilever wing. It will be noted that there is a considerable amount of overhang past the diagonal struts and that stay wires are completely eliminated.

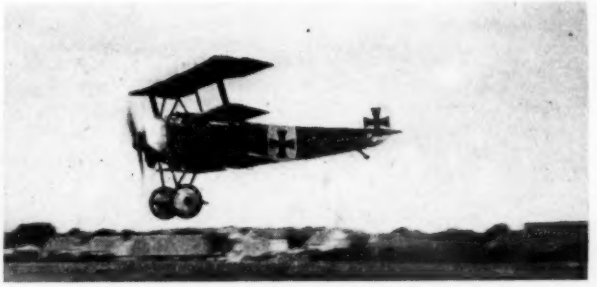
+ + +

A front view of a Fokker triplane in full flight in which the streamlined axle shows up to good advantage. This was the view that was not so pleasant to face in the good old days.

+ + +

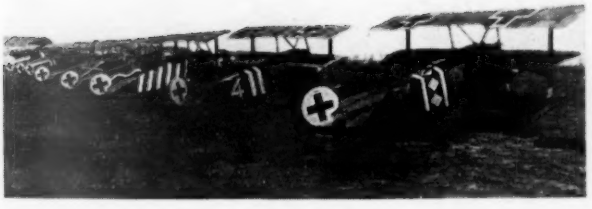
A well developed biplane Fokker, of comparatively late issue, showing good streamlining and a characteristic tail group of that period. Either the mechanic is strong or the tail is lightly loaded.

+ + +

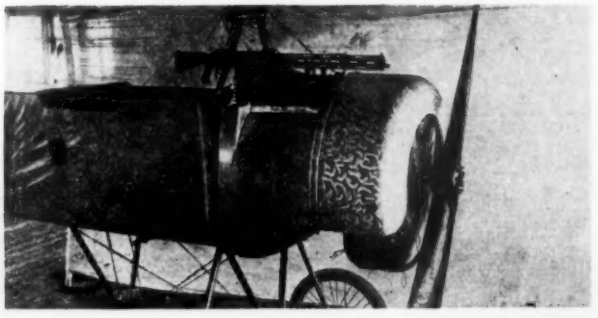


The "Red Knight" making a landing in his Fokker triplane. This was one of the earlier triplanes that aroused such curiosity during this period of the war.

+ + +



A flight of Fokker triplanes all set for the morning's patrol. All sorts of mid-fuselage insignia were used to distinguish individual planes in the flight. No. 4 is a neat marking.



This is an early 1915 production and is interesting for the reason that it carried one of the first machine guns (synchronized) ever mounted on a plane. Before that time almost any sort of arm was used.

Double Chute Packs.

## More Parachute Trials

PRACTICAL trials of cotton parachutes, recently carried out by the Navy Department, clearly indicate that the cotton parachute closely approaches the silk parachute in performance as to rate of descent, opening time, strength and ability to function after storage in the pack for sixty days.

The cotton cloth increases the weight of the equipment by one pound, an increase well within practical limits. Cotton yarn, of high strength in proportion to its weight and otherwise specially suitable for parachute cloth, was developed in the laboratories of the Bureau of Standards.

Cloth woven from this yarn in the bureau's mill was equal or superior to parachute silk in strength and tear resistance, met the requirements with respect to air permeability, and weighed only a few tenths of an ounce per square yard more than the silk cloth.

As cotton parachutes have been in use for some time by commercial aviators, on account of their lower cost, the results obtained from the investigation will be reassuring to them.

## Now We Have Parking Brakes

A NEW device on the "Pilgrim," nine-passenger transport plane, does away with the wheel chocks which have heretofore been an essential part of airplane equipment. This is a "parking brake" that locks the plane and enables the pilot to warm up his motor without getting under way.

Parking brakes probably would have been used on airplanes long ago, had it not been for the possibility of an absent minded pilot locking his brakes in the air and "coming a cropper" when he landed.

The new brake on the "Pilgrim" is fool-proof. It is operated by a toe pedal, but the locking mechanism is worked by hand. The pilot must first press down on the pedal, then pull a ring on the instrument board and finally release the pedal. A second pressure of the foot releases the brake.

## All About Tail Spins

IN MANY instances, manufacturers are seeking more stringent requirements for aircraft. Chief among the tentative proposals is one asking that light airplanes, which have been produced in large numbers since the first of the year, be required to exhibit the same spinning characteristics demanded of heavier craft.

Large planes under the Department of Commerce rules must recover from a tailspin in less than a turn and a half after making six complete revolutions. The planes must do this with the controls in neutral and the power shut off. Knowing that the new light airplanes are going into the hands of private individuals, who as a rule are less skillful than the commercial pilots, the manufacturers are insisting that the light models be subjected to the same spinning test.

The manufacturers include the suggestion that the rate of climb of land planes in feet per minute at sea level be "at least seven times the theoretical slow speed in miles per hour, but never less than 300 feet." The rate of climb for seaplanes, the proposed amendments say, should be at least six times the theoretical slow speed, but not less than 250 feet per minute. This means, in the case of a land plane which lands at a speed of 60 miles per hour, that its rate of climb must be at least 420 feet per minute, allowing it to clear an obstacle more than 400 feet high one minute after taking off from the ground.

## Lady Heath Becomes a Bride

WE all extend our congratulations and best wishes to Lady Mary Heath, who became Mrs. George Anthony Reginald Williams, at Louisville, Ky., on November 12. Lady Heath, who has conducted the "Women's Activities" column for many months, is well known and well regarded by our readers—particularly by the feminine division of our friends.

Lady Heath has had an extended experience in aviation, and is connected with many flying organizations in this country. It is interesting to note that she was the first woman to successfully dare a long distance solo flight. Her husband is also well known in aviation circles, so we might say in this case, that the matrimonial ship is dual controlled.

There was a large assemblage of guests at the wedding, among whom was Governor Flem D. Sampson of Kentucky. It was the governor's intention to officiate at the wedding, but when an examination of the Kentucky statutes showed that he was not empowered to perform the ceremony, the Rev. T. C. Eckton was appointed.

POPULAR AVIATION wishes the new couple a merry takeoff and a happy landing.

## And Now They Chop Wood

HEREAFTER, Canadian airplane pilots who ply the air routes over the little-known far northern forests, will be experts in woodcraft as well as flying.

Air-lines are instructing their men in woodcraft and are supplying concentrated food enough for three weeks' sustenance. This move is prompted by the number of flyers who have lost their way and made forced landings in the northern parts of British Columbia and the Yukon.

The idea was advanced by a coroner's jury at White Horse, Yukon, after it investigated the death of a pilot from starvation while lost within a comparatively short distance of a settlement.

## He Flew the Atlantic Eight Years Before Lindbergh

SIR ARTHUR BROWN, now visiting in the United States, is of the belief that ocean flying is still a "stunt" and that it has no present commercial significance. It will be remembered that Sir Arthur Brown and the late Sir John Alcock were the first to fly the Atlantic, a full eight years before Lindbergh made his historic transatlantic flight.

This first long distance flight to England, from New Brunswick, was made in a Vimy-Vickers biplane equipped with two Rolls-Royce "Eagle" engines. For the time, this was a remarkable achievement, particularly when we consider that an ordinary war-type bomber was used for the purpose.

Sir Arthur Brown, transatlantic flyer, and his son.

# You Tell'em -- It Was a Limping Lena!

*By* T-2003

All about a rowdy time-piler who got into a lot of grief—and then some.

WELL, here I am, you might say, on my bed of pain and sorrow. So you are a reporter, hey? Maybe you remember me. My picture was in the Morning Glotz of June 3rd, where it showed me alongside of the lucky stiff whose face had a circle around it, and he got five dollars for being photographed by the newspaper's Good-Will Reporter. Say, maybe you are from the Glotz, and if we could fix up a deal on this photo—oh,—you ain't, hey?

Well, anyway, now that I have introduced myself let me unload the story.

You see, I was flying the Goosebaum Special, doing a few odds and ends that Sunday morning at about 350 feet over the center of the airport. A lot of people was watching me, and even the transport pilots circled around watching me too instead of landing and letting off their passengers.

Down on the ground, one cheap dope run out of the crowd—out in the middle of the field—and he was tearing his hair and looking up at me. A lame brain, if ever.

Well, I dive straight down at this yakki—I will ride herd on him I think. As I get near the edge of the field, I pull up sharp, as I like that lazy feeling that comes over a guy when he pulls up sudden out of a dive. All of a sudden the bus gets a terrible wing flutter, just when some shingles went zipping past my head.

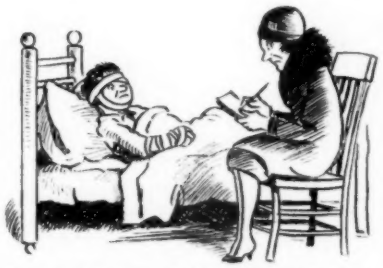
Regardless of some tree tops that stuck themselves on my leading edges, I pulled her up to about 3,000 feet so I could think this wing flutter over. I don't claim to be a wisenheimer who can place their finger on the spot without due consideration to the elements of the case. All of another sudden, damme, excuse me lady, damme if my engine didn't slow up and then stop.

Now can you imagine an engine, which is supposed to put out the power of 200 horses, not being able to wind a lot of lousey barb wire around the lousey hub? Yessir, this engine stopped dead like a cold herrink.

While I was thinking this new proposition over, I see the clock on the right hand side of the dashboard move over to 50, then to 40 and then to about 36. While I was watching it move, the nose of the crock drops, and the Goosebaum moves around in a sort of a spiral, except it didn't bank up like it ought to of.

I wanted to glide into a field that was near, so I pulled the stick back some more, as it was back only a little bit. I didn't mind the spiral, 'cause that's what I ought to do to make the clock on the left hand side of the dashboard come down from 3,000 to 500, at which time I am supposed to move the stick over to the middle, I gets over the red barn, and then glides into the field.

But I wanted to keep the nose up, 'cause the clock on the left was moving



"Say, maybe you are from the Glotz, and if we could fix up a deal on this photo—"

from 3,000 to 500 too fast, but the nose wouldn't come up, though I pull on the stick with all my might.

Well, something was wrong with the bus, so that was another proposition. But I am tired of thinking things over. I will act on the impulse, even if I do something rash—look at Lindbergh. So I think I will climb out and see what's up, maybe the weight of the barb-wire on the prop is too much and brings the nose down, 'cause that is one of the principles of aerodynamics.

I didn't have to lose no time to unhook my belt 'cause I never hook it anyhow in the first place. In the second place it sort of cramps me in my actions. Just as I was standing up to see what's the trouble, I must of hit an airpocket or something, because the next thing I know I had been flang out

"All of a sudden, the bus gets a terrible wing flutter, just when some shingles went zipping past."

and where was I? Why, nowhere you might well say.

I start to grab the harness of the seat cushion that the owner of the Goosebaum makes me wear in return for me paying twenty-five an hour for piling up time. I wanted to take that cushion off of me, as I was dropping for a lake and I didn't want it on me when I swam ashore.

I must of pulled something. It was a ring, I think, 'cause all of a sudden when I get a terrific jerk, I look in my hand and there was a ring with wire on it. Then I look up—and Jeez—if the stuffing hadn't come out of the cushion and was hanging over me like an umbrella.

Well, I lit alongside of the lake and didn't hit hard because I am light and easy on my feet, and in the Saturday night dances of the—Oh, all right, then I will stick to the subject in question if you insist.

When I get up, I see a lot of people running for me. When they get close, I see they look mad and was yelling things at me. For awhile I think they are mad because my Goosebaum Special had dropped into some dopes on the edge of the crowd.

But then, I remembered that the grease-monkey, who takes care of the seat cushions, once got awful sore at me when I pulled something on the seat cushion harness I was carrying out to a ship and all the stuffing come out. Then, I think to myself, "I bet that ape is now sore about this seat cushion and has got all his friends of his to brutalize me."

So I ups and shucks my harness I had on, and run over to a flivv parked in the nearby. I got it started easy enough and I take off then and there, because this is Mob Rule if ever I see it.

Well, I would have got home all jake, and no-one the wiser or nastier and no hard feelings, but some hick sticks his front bumper across me while I am sailing by trying to beat the red light, which is changing without any notice to speak of—you might say.

But that's just the way things are in his life—get a guy down and every yoick tries to jump him. The cop tells me that there is a number of people waiting for to see me when the nurse gives the "Go Ahead." From what he says, they are the following viz to-wit, namely:—

(1) The owner of the flivv, which was a lousey bus.

(*Continued on page* 53)

## He's Off of Propeller Making

VINCENT KUNTZ, Chicago, Ill., thought he would beat the propeller game and make his own. That was three months ago and now he's changed his mind. He writes in to tell us his sad story, and from our own experience we know that it is true.

"Well, I am off of propeller making —boy. I have glued up enough wood to start a furniture factory and have spent enough time to build a whole ship, yet I haven't got even a fair looking stick to show for my trouble. You tell them, big boy, to buy their props and to forget wood carving.

"I only wanted a four foot prop, so I started in, thinking it a pretty soft job and wondering how the companies had the gall to ask so much for them. I carved one out, all right, and then tried it. I couldn't even taxi with it, for it held the engine speed down too low. The next one overshot the mark, with a pitch so small that the engine nearly ran its head off, and while I could taxi, yet the engine couldn't get her off. This was about the history of the other six propellers I made, and after it was all over, I picked up one for $2.50."

## Flotation Gear Saves Lives

THE success of special flotation devices for landplanes was strikingly demonstrated in the rescue of Willy Rody, Christian Johanssen and Fernando Costa Viega, trans-Atlantic flyers. They were forced down in the North Atlantic and survived nearly a week on their floating plane before they were picked up.

Makers of the monoplane Esa, in which they tried their hop, said the floating duration of the plane was only from 20 to 24 hours, but they did not know that a flotation gear was attached in Portugal. Such special gear is certain to remove some of the perils from over-water flights in land machines.

## A Flying Vamp

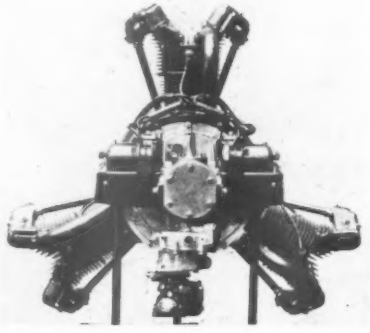
FRANK A. VAN DERSARL, veteran flyer of Denver, Colorado, has designed and built a plane named the "Vamp" that is able to take off in ten feet—less than its own length. This feature, Van Dersarl believes, makes it practical for direct take-off from the deck of a submarine without the use of a catapult. The new plane has a wing spread of only 26 feet and is 17 feet long. It lands at 28 miles an hour.

It is being tested with a 100-horsepower, 5-cylinder radial motor and the designer says that it has a climbing rate of 1,000 feet a minute when so powered. In a recent altitude test, the craft reached 13,000 feet. In outward appearance the plane, which is a single-seater open biplane, is similar to the Boeing pursuit planes used by army aviators.

## Aeromarine AR-3 Lightplane Engine

A NEW lightplane engine, known as Aeromarine AR-3, has recently been produced by the Aeromarine Plane and Motor Company which bears the Approved Type Certificate No. 74. This engine has a bore of 4⅛ in., a stroke of 4 in. and a piston displacement of 160 cubic inches. It develops 50 h.p. at 2125 r.p.m. The total weight without the hub is 144 pounds, giving it a net weight per (horsepower) of 2.5 lbs.

Double ignition, provided with two magnetos is employed, the spark plugs being placed opposite each other and parallel to the crankshaft. All valves, pushrods, rocker arms and tappets are entirely enclosed in oil tight cases, and are lubricated from the rear by Zerk oilers placed in the fulcrum pins. The rocker boxes are provided with covers



The Aeromarine AR-3.

for easy inspection and tappet adjustment.

A two-piece crank shaft is supported by four bearings, one of which is a plain bearing with a babbitt liner while the other three are of the ball type. Propeller thrust is taken in either direction by the deeply grooved forward ball bearing. The entire assembly of the crankshaft, and its adjacent parts with the exception of the cam and thrust bearings, is made independent of the rest of the engine. Hence, when once the relative endwise distances are determined no adjustments are necessary when reassembled. It is claimed that the fuel consumption at cruising speed ranges from 2 to 2½ gallons per hour, giving approximately 30 to 40 miles per gallon.

## A Model Museum

WHAT is believed to be the most complete and accurate group of scale models of airplanes ever collected by any aircraft manufacturer, is now on exhibition in Seattle, home of the Boeing Airplane Company.

Produced by the company's model building department, the collection comprises 27 miniature airplanes, replicas of various types of aircraft produced by this company. The collection is valued at $10,000.

## Falcon Tests Prove Successful

THE last few weeks has witnessed the advent of a new light monoplane, the Falcon, produced at Portland, Indiana. Test flights were conducted successfully at the Brigham airport last week in the presence of company officials and engineers, including a large crowd of interested spectators.

With a test pilot at the controls, the ship was slowly taxied to the extreme north portion of the field over extremely rough ground with a heavy growth of high grass. Then, swinging the Falcon around, it was headed into a stiff southwest wind. The pilot then "gunned" the engine, and with a powerful roar, the plane rose gracefully into the air after traveling but a few feet.

Climbing rapidly to an altitude of about 2,000 feet and circling about a bit, the ship was tested in every conceivable manner, stalling, sideslipping, nose diving. Putting it through breath-taking wing-overs, spirals from great heights, pulling it up into rocket-like zooms and finally fish-tailing to a three-point landing with practically no forward roll.

This new monoplane has proven the capacity of slow short landings and a climbing angle that will let it take-off and land in small fields. Further demonstrations proved the "safety principle" which was predicted "on paper" beforehand. Setting the course to Blane, Ind., four miles west of Portland, the pilot shut off the engine and from this four mile point, glided back to the Brigham airport making a safe and easy landing with a dead engine.

The Falcon has a gliding angle of one-in-fourteen, that is to say, if the ship is one mile up in the air and the motor dies it can be brought down safely fourteen miles away. If the motor should fail when the plane is up only a short distance in the air it can be landed with an unusual degree of safety because of its maneuverability at slow speeds.

The cabin is roomy and comfortable, passenger and pilot are seated side by side, with complete visibility in every direction. It is possible for anyone, experienced in operating an automobile, to fly the new Falcon with from two to five hours of instruction, which is given with the purchase of a plane.

The engine is a two-cylinder air-cooled type, built by the makers of the ship, has a four-and-one-quarter inch bore and a four-and-one-half inch stroke. It is of the double-throw crankshaft opposed type, developing forty-two horse power. The gasoline consumption is three gallons per hour, at the plane's cruising speed of seventy-five m.p.h.

The low speed is twenty-eight m.p.h. with a top speed computed at eighty-five m.p.h. With the speed wing the maximum speed is increased to ninety-eight m.p.h. Landing gear is of the "airwheel" split axle type.

# What Our Readers Are Building

A department devoted to our readers' activities in airplane and glider construction.

WE have been considering this addition for a long time, a department in which we can show the ingenious and practical aircraft built by our readers. This is of great value to other readers who have lightplanes, gliders, or models under contemplation or under actual construction.

Now, the whole success or failure of this department is up to you fellows. The only way that we have of filling this column is to have you send us the dope, always accompanied by photographs of the completed job. If you fail to send us this information, then it is a cinch that we'll have nothing to publish and the whole idea will be nothing more than a flop. Come on, fellows, sit down tonight and tell us all about it!

We are particularly interested in the construction of lightplanes and their engines, and this page is a fair example of the sort of material that we are looking for. Send us drawings or sketches, if you like, but please send a photograph or snap-shot with them to prove that the job was actually built. Of course, we will have to trust you in making statements regarding the performance—but please draw it mild.

We hope that the fear of authorship will not keep you from writing to us. We don't care how poorly you write so long as you give us the facts in the case. If necessary, we will be glad to write the story for you here in the office. All we want is facts, and a few clear photographs that will stand reproduction. Amateur snap-shots will be satisfactory so long as they are clear and distinct.

## Another Ford Engine Defender Appears

A VERY interesting description and photograph of a Ford powered lightplane, built by himself, has been received from Dick Privette, of Abita, La. Dick shows a very neat trim job, constructed from plans by N. E. Storms.

This engine has seen less remodeling than most of the Ford powered ships that we have seen or read about. It is a standard Model "T" engine, with the regular head, the only extras being a magneto and the lubricating system taken from an old Hudson car.

Dick says that the engine turns up 1,550 r.p.m. with a six foot propeller, giving a top speed of about 55 m.p.h. and a landing speed of 18 to 20 m.p.h. He claims a mileage of 15 miles to the gallon of gas.

We are specially interested in this ship for the reason that there have

Privettes Flivver Ship.

been so few alterations on the engine. Usually, to get any performance at all from the Model "T," it is necessary to get a special cylinder head, special aluminum pistons, special connecting rods, a special camshaft, a magneto and a special lubricating system, so that about all that is left of the original Ford engine is the cylinder block. It is then only by courtesy a Ford engine at all.

## Will a Henderson do the Trick?

HERE is a question asked of us, and not being so anxious to assume the responsibility of an answer, we are passing the burden of the reply to our readers for comment.

It seems that Mr. E. L. Smith, Eugene, Ore., and connected with the fire department, has bought a small sportplane. It was not complete when purchased, but has a Henderson motorcycle engine in it, and this is just where the question hinges. Mr. Smith has been advised by the authorities in the neighborhood that the Henderson motor will not propel the ship, and he is asking our opinion on the subject.

After glancing over the following specifications, as submitted to us in Mr. Smith's letter, we would like to have your guesses and see how they check up with ours. Will it fly—or is the engine too small?

| | |
|---|---|
| Span | 18 Ft., 6 In. |
| Chord | 3 Ft., 2 In. |
| Gap | 3 Ft., 3 In. |
| Total wing area | 105 Sq. Ft. |

Unfortunately, the letter does not give the weight so we are not able to make estimates by the usual methods. Our guess, looking at the little biplane

Do you think a Henderson will do?

in the photograph, is that it will fly to some extent but lacks enough power reserve and speed to make it safe enough to handle.

## A Chevrolet Engine Drives This One

WE have all heard a lot about converted Ford motors being used as airplane engines, and still more about converted motorcycle engines, but it is not often that we run across a lightplane propelled by a four cylinder Chevrolet engine. However, here we have the Chevrolet engined plane built by Everett Sink of Zanesville, Ind., which is said to put up a remarkable performance.

We have a letter from Mr. Sink, a garage man, who claims that the ship will do 75 m.p.h., will take-off in 250 feet, and climb at the rate of 400 feet

Powered with a "Chevy" engine.

per minute. This is about as good as a "boughten one," and that is something. The specifications read as follows:

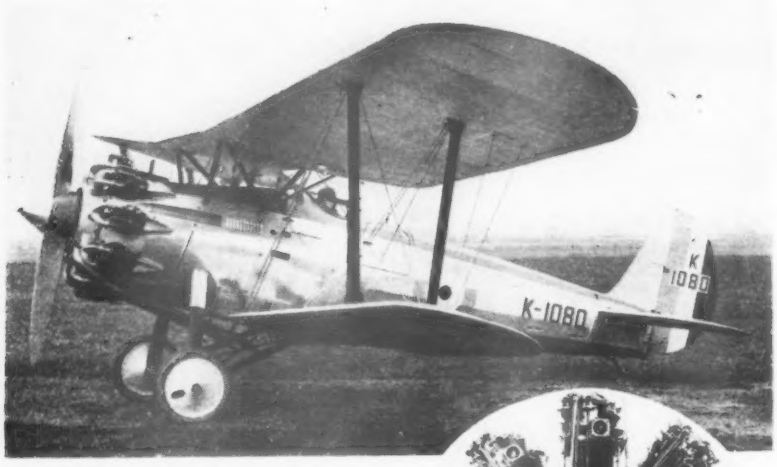
| | |
|---|---|
| Span | 31 Ft. |
| Chord | 6 Ft., 3 in. |
| Length | 21 Ft. |
| Weight empty | 610 Lbs. |
| Useful load | 290 Lbs. |
| Weight, loaded | 900 Lbs. |

This parasol type monoplane has been tested by Lloyd Decan, of Plymouth, Ind., who claims that it is a nice flying ship. This, apparently, is another victory for the converted automobile engine and will be entered up in our records as such.

## How Many Parts?

THE usual variety of individual parts entering into the construction of modern aircraft is illustrated in figures released recently which show that a total of 145,742 parts were used in the assembly of a Boeing tri-motored passenger transport plane. Of this total 60,383 parts were produced at the factory from special drawings, while the balance of 85,359 parts included bolts, nuts, rivets, etc.

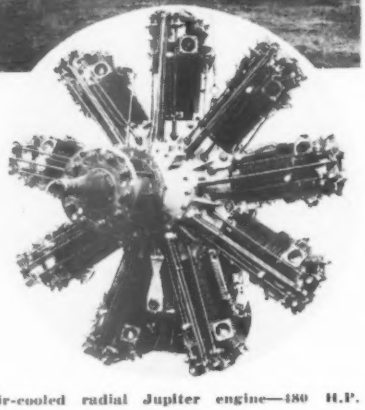
## Bristol Fighter With Jupiter Engine




English Bristol Fighter.

ONE of the most interesting British developments in the way of military aircraft is the Bristol Single-Seater Fighter known as the "Bristol Bulldog." There have been so many calls from our readers to show a picture of this machine that we have secured this striking photograph to meet their needs.

Together with the picture of the ship is a photo of the engine that drives it—a 480 h.p., nine-cylinder Bristol "Jupiter" engine, Series VI F. It will be noted that all of the cylinder is below the general cowl line with the exception of the combustion chamber—no cowl rings are used. Also note the heavy pitch of the propeller, the blades being nearly parallel to the shaft at the roots.



Air-cooled radial Jupiter engine—480 H.P.

As with most British ships, the "Bulldog" has a very pronounced dihedral angle. The fuselage is very carefully laid out, particularly at the forward end.

## New "Stratosphere Plane" Completed and on Test

THE new Junker's "Stratosphere" Plane, JU-49, has been taken up for trial flights by Herr Hoppe, the designer of the ship. It is said that the trial flight was entirely satisfactory and that the ship shows unusual ability in attaining extremely high altitudes, as predicted.

This airplane is provided with an air-tight cabin, so as to protect the passengers against the intense cold and low atmospheric pressures at the altitudes at which this plane is to fly. The cabin is insulated and is provided with oxygen apparatus.

The Stratospheric ship intended for high altitude work.

## Powerful Searchlight Assists Night Flying

AN innovation in night flying was demonstrated recently by Captain Eaton, commandant of Rodgers Field when he flew over Pittsburgh in a bombing plane with a tremendously powerful Westinghouse searchlight mounted on his ship.

This new searchlight, weighing a little more than 50 pounds and about 18 inches in diameter, will throw a beam visible more than 50 miles. It employs a 250 watt lamp, operated from an ordinary storage battery, and the narrow beam of light is so powerful that a newspaper may be read at a distance of five miles.

To demonstrate the possibilities which exist for this unit in aerial service, when associated with light sensitive tubes, Captain Eaton circled the city and then trained his aerial searchlight on the top of the hotel where a photo-electric cell had been located.

The instant the searchlight beam hit the photo-electric cell, it actuated a mechanism that set off a powerful flare. This demonstrated the feasibility of producing mechanical signal action by means of a beam of light.

"Under battle conditions," stated Captain Eaton, "night fliers feel their way in pitch darkness far above enemy lines or cities. With one of the new type Westinghouse searchlights, it is believed possible to flash the light on and off and so permit the aviator to see exactly what was on the ground below.

"The searchlight, so switched on, would instantly reveal to the observer's eyes, whatever was transpiring below. Switching off the light, the plane would again be in darkness and when the pilot changes his position, the enemy would not have time to pick up the ship with ground lights.

If the German Zeppelins, which raided London, had been equipped with searchlights of the new type, it is fairly certain that they could have done far more damage than they did. At that time, they hovered high in the air and had to guess whether or not they were above the British capitol.

## Free-Wheeling for Airplane Propellers

IT IS believed that the principles of free-wheeling may soon be introduced to airplane construction. Several aeronautical experts are conducting tests with a new type of propeller which is capable of making a great saving in plane operation by the use of the free-wheel system.

The new propeller is free from vibration and may be used with either high or low speed equipment. The engineers believe that it will add at least two hours to the flight radius of a tri-motored plane and more than four hours to that of a bi-motor. This will allow about a 45 per cent increase in the payload of the machine.

# Parachuting With Jimmie Donahue

*By* F. M. MILLER

**All of the sensations after a big jump-off and things that might happen afterwards**

WHAT does a parachute jumper think about?

Does he review his past life. in a long drop, or merely meditate over the seamy parts? Not many of us could answer the question better than Jimmie Donahue, holder of the official world high jumping record and former jumper for an ex-barnstormer named Lindbergh. He is a young man who must have about used up his luck, for Donahue has made 463 jumps since 1922.

"The trouble is," says Jimmie, "that few plungers do a great deal of thinking—even when trying. No matter how experienced the jumper, his mind rarely reacts normally in a long drop. Especially when spinning, the brain grows soggy. The horizon and the sky gyrate madly, and dat ol' debbil earth leaps up at one like a projectile.

"More often than not, a beginner slips his mental clutch. Loss of alertness accounts for the demise of many green jumpers who had failed to pull the rip-cord. All too well did they remember to clear the ship before yanking the bit of thread upon which hangs life.

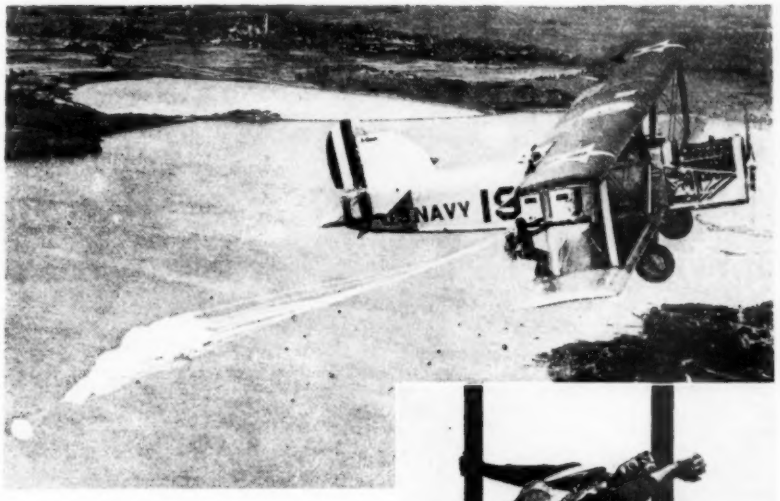
"Clouded grey matter is sluggish. These young men and women apparently misjudged the interval after leaving the plane and struck the ground."

There is no special discomfort in splitting thin air in warm weather, according to Jimmie. The wind shrieks, but on the whole the sensation is dreamy, exhilarating and satisfying to an extreme.

To an old hand, a long drop is not terrifying but rather enjoyable. The jumper has no trouble getting his breath. But so easily will the weird suspense lull a new jumper into a false sense of security that his mind may foul—not the 'chute—and zip him to the ground.

Even when ' equipped with two 'chutes, a green hand often fails to pull the second rip cord when his first pack fails. Donahue makes special mental preparation for a double-jump, in which he cuts loose from one parachute and then opens another.

While grasping the wing struts of a biplane, or calculating a head first dive from a cockpit, he repeats to himself the magical formula, "I've got to pull the second cord." As he falls he keeps the words running through his mind. He drums the command deep into his subconscious mind which functions long after normal processes become unreliable.




A "Pull-Off" Jump.

The excitement of his first step into space so tenses the muscles of a beginner that he finds it hard to jerk the cord on a "live" jump. It was a long time before Donahue developed an iron self-control that enables him to relax and use his arms at will.

Yes, jumping looks simple from the ground. But more exigencies than a fouled pack can bring sudden death. Unless the jumper leaps properly, the "risers" or first cords out of a pack will wrap around parts of his body and inflict serious injury when the 'chute "cracks." If wrapped around a finger, the "risers" will whip the finger off by the abrupt jerk.

If snared about a jumper's neck, the "risers" will break that important member. More than one jumper has explained away good luck with the old saw, "I'm born to be hung." And sad to say, more than one jumper has been hung in mid-air with his limp body dangling thousands of feet up.

The only safe way to avoid the "risers" on a live jump, according to Jimmie, is to dive head first. A feet-first leap is more natural but far more dangerous.

For some reason which Donahue has never been able to explain, a live jump from the door of a cabin plane usually sends the jumper spinning. Once spinning, he cannot stop. The human plummet can only pray, as he pulls the cord, that his spinning body will not wrap up the silk and drop him in a ready-made shroud. Jimmie is not sure, but he believes the unbalanced air flow around a high wing monoplane causes the spinning.

Such hazards are all part and parcel of live jumping. The student jumps,

A Dive Backwards into space.

taught by many commercial flying schools, are usually conducted in the "pull-off" manner. The student hangs to an outer wing strut and pulls the cord. If the 'chute opens, he is yanked into space. If the 'chute doesn't open, he is still hanging on the strut and is well content to stay there.

HERE'S a tip from Donahue that every parachute-wearing pilot should bear in mind. When in a damaged plane, or in an uncontrollable spin, always jump on the outer side of the ship. Otherwise, the plane is almost sure to spin into the jumper when the big canopy opens. The "how" and "how not" of emergency jumps were strikingly illustrated two years ago at Colorado Springs during the testing of experimental planes.

Errett Williams, a veteran flier, while running off full-load flight tests in a new type of plane, had extreme difficulty in getting into a spin. But once it had made a few turns of the maneuver, the ship "flattened out" and refused to recover. Errett fought the ship for 25 turns. Then he broke

through an emergency window and jumped off the inner wing.

He fell 1,500 feet before the 'chute opened. A few seconds later, a whistling noise caused him to glance up. The mad airplane was almost upon him. A wing whipped into his 'chute and tore the silk of eight panels. Luckily, the parachute did not catch. Williams was finally found lying unconscious in a mountain valley with sprained ankles and a badly sprained back. Enough for the "how not"!

Now for the "how." Coming out in a Pullman from his home, James S. (Shelly) Charles, another test pilot, casually considered the characteristics of the plane he was to spin-test. He considered the possibility that he might soon make his first parachute jump.

Now, few pilots like to jump, but when called upon, they prefer to jump correctly. Mile by mile on the train, "Shelly" rehearsed in his mind every step of leaving the cabin in an unmanageable tailspin, by crawling out on the outer wing and departing into man's new thin element. The plane was a low-wing monoplane with the fuselage resting above a single cantilever wing.

A few days later Charles found himself in the expected predicament. The experimental plane was flat-spinning like an inspired dervish. Without conscious thought, Charles crawled onto the outer wing, grasped the leading edge and pulled. He was slung 800 feet on a level with the plane. He plucked the rip-cord from its roots and drifted into a wild range of hills ten miles from civilization. The only damage resulting from a 7,000 foot drop was a sprained ankle. Score one for the subconscious mind and then introduce another member of the Caterpillar Club!

Donahue himself has never made an emergency jump, but as a professional he has made more than his share of air drops and has experienced about as many close shaves as anybody in the game. He has been a human fly, a wing-walker and has done plane-to-plane and automobile-to-plane changes.

Just clear of the ship on a "feet-first" jump. Note double packs.

He is now 28 years old—years older than he expected to be many times—and of a trim muscular build topped off with an ample supply of curly auburn hair.

He learned parachute jumping in 1922. He quit in 1923 to jump for Charles A. Lindbergh, then a barnstorming nonentity and the harassed owner of another Jennie that had survived Kelly Field. Within a week, the pair were buddies. Ask the war vets if mutual hazards and discomforts won't cement a bond?

"Slim" and Jimmie put up with sloppy weather, motor grief and frozen assets for half a year in hilly southern Missouri. Once Lindbergh had to hock his tools to buy gas and oil. Nor has he now forgotten Jimmie. He is not the type.

NOT long after learning to "slip" a parachute away from ground obstacles, Donahue branched out into the more specialized arts of wing-walking and mid-air changes. Once, on a bet, he hung with one hand from a tail skid. A regular feat was the triple jump. This act requires a lightning sense of timing and depth perception.

A slight miscalculation leaves the plunger too near the ground to open his third pack. Only last year Jimmie learned this lesson anew. Let the veteran describe a near thing which occurred while trying out a second-hand 'chute for a test pilot. Caledonian caution led him to wear an extra lap-pack.

"Carrying an altimeter, as an experiment, I jumped at 3,500 feet and started rolling. In spite of the many times I have jumped, I could not keep my sense of position. The earth and sky whirled around me. I pulled the rip-cord. The parachute exploded with the noise of a cannon. On the next roll I saw torn fragments above me.

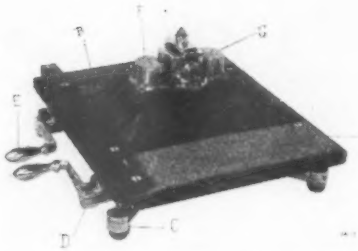
"As is customary with me, I was automatically reminding myself of the advisability of jerking the second pack. I had spun down 2,000 feet, I judged, but I could not tell by the look of the ground. It was too blurred. I focused my eyes on the altimeter in my left hand. It was useless. I could see that the needle was not falling as fast as I was. I whirled and whirled, catching a glimpse of the sky and then one of the ground.

"Every time I saw the ground it was a few hundred feet nearer. Many things raced through my mind. I knew I must be face down when the 'chute opened. Finally I saw my chance and yanked the cord. The wind whistled like a siren. I caught one last look at the ground and it was right on me. I knew it was then or never."

A jumper falls much faster with two open 'chutes than one, especially when one umbrella is just so many silken threads. A person can't remember being struck by lightning. Jimmy struck hard. When he revived with two broken ankles in the hospital the next morning, all he could

(*Continued on page* 52)

## New Device Measures Human Fatigue



The "Wobblemeter" used in tests.

A NEW apparatus, to determine the effect of flight fatigue on the equilibrium of airplane passengers and pilots, has been demonstrated in New York. This apparatus, called the "wobblemeter," was developed by Dr. F. A. Moss of George Washington University.

Weighing about 14 pounds and measuring 15 x 12¾ x 9 inches, the apparatus consists of two footrests (A) and (B) fitted to a base (C) in such a way that they are free to oscillate in a horizontal plane after the operating levers (D) and (E) are released.

The subject taking the test attempts to balance himself while standing on the footrests, the total amount of motion made in the attempt being recorded by two meters, one for fore-and-aft motion (G) and the other (F) for lateral motion.

The total amount of motion to reach and maintain equilibrium, in a stated unit of time—usually one minute—will be an index of fatigue or lack of it.

If it is desired to establish the fatigue due to an airplane trip, the test is as follows: Before the person enters the plane, his initial index of fatigue is established. Suppose it reads 35 before a flight of 200 miles.

After the flight, the index of fatigue is again established on the wobblemeter, and has increased—say—to 48. Obviously, the ratio of the reading after the flight to the reading before the flight, 48/35, will equal 1.37, thus giving the measure of the riding endurance of the person in question or the quality of the flight.

The lower the ratio, the better the riding qualities of the flight. Obviously, a person roughly shaken over a stretch of bad weather will be more fatigued than one who has enjoyed a smooth journey. Tests have shown that when subjected to the same fatiguing conditions, most people will have the same ratio of final reading to the initial reading, whether the initial reading be high or low.

## Correction

BY SOME error in the makeup, November issue, the wrong caption was put under the photograph of the Eaglerock ship. The picture shown was the large Eaglerock, and not the Alexander Flyabout.

## Reveals Vibrations of Flying Airplane

A REALIZATION that there yet remains in the modern airplane, vibrations which produce many undesirable conditions during flight, has caused research members of the Society of Automotive Engineers to begin seriously the study of airplane vibration.

Excessive vibration leads to premature deterioration, erroneous indications of instruments, fatigue of structural members and the fatigue of the occupants.

A systematic study of the problem by Mr. Stephen J. Zand has resulted in the invention of a new recorder called the vibrograph—a form of photographic recorder.

After the vibrograph has been loaded with film—similar to loading a camera—it is mounted on any part of the airplane, the vibration of which is under study. A clock driving mechanism is then wound; a record is obtained by closing the switch for a few seconds.

Examining the results, the amplitude of vibration and the relative bodily or structural reactions may be minutely studied and the detrimental causes eliminated.

## Big Demand for Hostess Jobs

TWELVE young women fly as hostesses in planes of the Eastern Air Transport—and over 5,000 aspirants are after their jobs. It seems to Mrs. Anne Porter Cullum, who heads the hostess department, that every young lady between 21 and 25 years of age wants to become a flying hostess, and those who haven't written letters have had some influential person write or phone.

"There used to be an idea that women wouldn't fly in airplanes," said Mrs. Cullum, "but I know better. When we first began the hostess service, letters were received from all over the United States. Recently we put our big Condors on the long runs to Atlanta and Jacksonville, and now a new flood of applications are coming in. Of course, I add new hostesses from time to time, but I couldn't begin to care for all who apply."

Mrs. Cullum, whose office is in the passenger terminal of Eastern Air Transport at Newark Airport, declared that most of the applicants seemed to be of the type desired by the airline. And most of them, too, seem to realize that there is considerable work in connection with the job, but are willing to work for the privilege of flying.

## Boys Want Drawings

A FAVORITE indoor sport of "Young America" evidently is the making of airplane models. The Boeing Airplane Company received 4,000 requests last year from boys for drawings and photographs.

## Trimotor Plays Fire Engine

Eleven of the firemen all lined up and ready to enter the ship.

TRIMOTOR planes during the past summer successfully combatted forest fires in the United States forest preserves in the Northwest, according to information just received by the Ford Motor Company from N. B. Mamer of Spokane, Wash.

Flying over dangerous rugged country, through dense smoke, Mr. Mamer, at the controls of a Ford trimotor, repeatedly transported large crews of government fire fighters and their equipment from Spokane to the scene of fires.

The flights were accomplished in approximately two hours, whereas four to five days would have been required to land the crews in the remote forest sections had they been forced to travel by rail, motor car and pack horse.

During the course of the fires, the trimotor carried 300 fire fighters and their equipment into the district, as well as 60,000 pounds of equipment and merchandise. For this purpose the seats were removed so that maximum loads could be carried.

The plane, thus lightened, repeatedly carried loads of 2,500 to 3,000 pounds of men and merchandise, even though it was necessary to climb up to 14,000 feet to clear the mountains and the stifling smoke from the fires beneath.

Most of the fighters and their equipment were landed at Chamberlain Basin Meadows field in the Idaho National Forest, 6,000 feet above sea level. Others were delivered at a field at Moose Creek in the Selway National Forest. The latter field lies at the confluence of Moose Creek and Selway River. It is 1,700 feet long and surrounded by high mountains and tall dense timber.

Aviators said that no plane could be landed there, according to Mr. Mamer, who was doubtful himself whether the chance should be taken. The first time a fire emergency arose, however, a trimotor carrying a load of fire fighters, was set down without trouble in the field, and since that time repeated return trips have been made without accident.

## Los Angeles Model Contest

RESULTS of the Los Angeles Miniature Plane Contest, which was held recently, have been announced. Donald Donahue of Los Angeles, having the highest individual point score, has been declared winner.

Miniature aircraft activities in Los Angeles are sponsored by the Los Angeles *Times*. They consist of classes held each Saturday under the direction of the newspaper, at various city playgrounds where the boys learn all phases of airplane construction and operation at no cost to themselves.

The official results of each contest follow:

*Outdoor hand launched stick models*—Donald Donahue, 9 minutes, 9¼ seconds; Thomas Scully, 8 min., 9 sec., and John Berg, 7 min., 57 sec.

*Hand launched fuselage models*—Donald Donahue, 22 min., 22½ sec.; Howard Broughton, 21 min., and L. A. Pratt, 13 min., 28 sec.

*Indoor hand launched stick model*—Walter Powell (San Francisco), 9 min., 45 sec.; Tamatsu Shimizaki (San Francisco), 8 min., 42 sec.; John Berg, 8 min.

*Fuselage models, rising off the ground*—John Berg, 6 min., 52½ sec.; Donald Donahue, 5 min., 56 sec., and Huston Hager, 5 min., 55 sec.

(Home town of contest winners, unless otherwise noted, is Los Angeles, Calif.)

# The "Köhl Flying Wing" Does Well

## This tailless ship has given a good account of itself in trial flights

View showing the ailerons, fin and rudder.

TAILLESS planes in general, such as the Köhl Flying-Wing illustrated here, are not a new idea by any means. Many fairly successful designs of this type have been produced in years past, both in the United States and in Europe, but the tendency toward the standardization of airplane types has blockaded development in this direction. Inventors have been endeavoring for many years to eliminate the cumbersome independent tail group that projects—birdlike—from the rear of conventional airplanes.

And here we must come face to face with another shock. The tailless ship, although possessing no external tail that is visible to the naked eye, is not really tailless in effect. Somewhere in its make-up—and you can depend upon it—will be found the effective equivalent of the elevator, stabilizer, vertical fin and rudder. The functions of these parts are now incorporated within the wing itself. Longitudinal control and steering are just as necessary with a flying-wing as with a standard ship.

However, from a practical standpoint the so-called tailless ship can rightfully claim many advantages. In the first place, we do away with the weight and head resistance of the tail group and that of the long fuselage extension or outriggers necessary for carrying the tail group. This, of course, reduces the power required for the propulsion of the ship and its fuel consumption. Speed is improved because there is no longer any drag from the auxiliary surface supports.

Second, the flying-wing is much shorter and more compact, so that less space is required for its storage. This advantage alone solves one of the greatest problems facing the private owner of today who is paying exhorbitant rental charges for hangar space. Third, the tailless ship can be built much cheaper than the present airplane, and again we make an appeal to the pocketbook of the private owner and aviation fan.

Fourth, but not least, is the fact that the tailless ship is the ideal type for the installation of a pusher type power plant, so that it can automatically lay claim to the many advantages of pusher propulsion, such as better visibility, less noise and dirt, reduced head-resistance and the advantage of having the propeller act directly on the wake-stream.

Getting back from our generalizations to the Köhl Flying Wing in particular, we find that this ship is the final outcome of numerous experiments with tailless gliders performed by the Rhön-Rossitten Gesellschaft in Germany. This famous German glider school began with a tailless glider, "The Stork," in 1929. After successful tests with it, when flown as a glider, the school installed an eight horsepower engine. This proved even more successful than when performing as a glider and it quickly demonstrated its superiority over other lightplanes in the locality in the way of speed, fuel economy and safety.

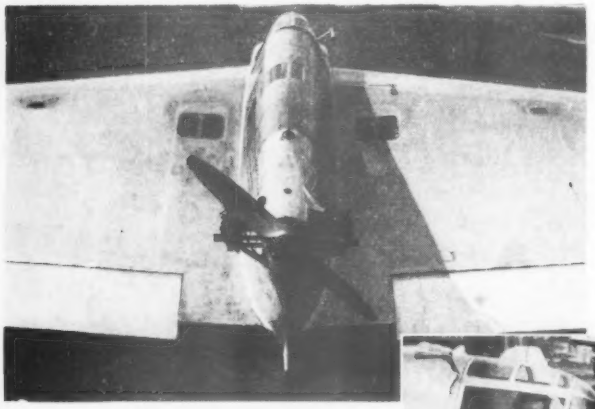
Capt. Herman Köhl, the famous transatlantic flyer, soon became a convert to the flying-wing idea, and his enthusiasm was largely responsible for the construction of the present larger and better Flying-Wing that succeeded the Stork. Sponsored by Capt. Köhl, the Flying-Wing, the successor to the Stork, was constructed by Alexander Lippisch, assisted by the celebrated German glider pilot, Günther Groenhoff.

As the ship now stands, it is a pusher type, propelled by a two-cylinder, 30 h.p. engine. The forward or entering edge of the wing is of the characteristic wedge shape common to tailless ships but with a straight trailing edge. A cabin or "nacelle," in the center of the wing, is so located that perfect vision is had to the front and the view is unobstructed by smoke, oil vapor or the blurr of a propeller disc.

By employing a wedge shaped entering edge, concentration of the center of pressure is avoided, so that there is not any well defined point of support that will be disturbed by changes in the angle of attack. In short, the support is spread over a considerable fore-and-aft distance, and the longitudinal stability is seldom disturbed to any extent. By this means, the necessity of an independent stabilizer surface is avoided, for longitudinal stability is of a high order, within the wing itself.

However, all is not gold that glitters, and the wedge shaped entering edge is not all that could be desired from the standpoint of directional stability. Such wings, it should be understood,

(*Continued on Page* 53)



Left: The two-cylinder engine arranged as a pusher.

Below: The pilot has good visibility forward and to sides. Note the thick wing.

# Question and Answer Department

QUESTIONS relating to the general subject of aviation will be gladly answered in these columns by our staff of experts, providing that they do not involve much research work and are of interest to our readers. Among the subjects admissible are simple problems in aerodynamics, maintenance, operation, construction and aeronautic engines.

The answers to your questions have two purposes. First, to give you the information you desire, and second, to present interesting subjects to our other readers who enjoy discussions of this sort. It is for the latter reason that we wish to avoid questions dealing with purely personal matters or subjects that do not concern our other readers.

This department is open to all of you, and we heartily solicit your questions and problems within the scope mentioned above. Send them in. We will be more than glad to take care of you. There are a whole lot of pertinent subjects that have not already been covered, and if you will write in, we will do the best we can. This service is free to everyone.

Address your letters to the Question and Answer Department, POPULAR AVIATION, 608 S. Dearborn St., Chicago, Ill.

* * *

QUESTION:—Frank Repetto, Elkhorn, Wis. *What sort of lubricating oil is best for aviation engines? Will automobile oil serve the purpose, or does a special oil have to be used?*

Answer:—FOR high powered air-cooled aviation engines, the cylinder temperatures are exceedingly high, due to the high compression and also to the fact that the engines are run at nearly full throttle for long periods. This means a more viscuous or thicker oil than that used for automobiles—an oil in the nature of Mobiloil "B."

Watercooled aviation engines operate at a somewhat lower temperature and therefore the thinning out tendency is not usually so great. The water, or other liquid in the cooling system, limits the upper temperature, and as there is no such upper temperature limit with air-cooling, it is safe to use a lighter oil with water-cooled engines than with the air-cooled type.

* * *

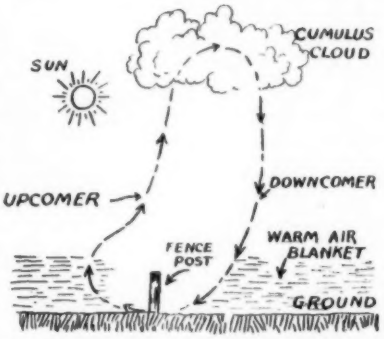
QUESTION:—James K. Weeden, 505 Surf Street, Chicago, Ill. *Is it possible to use a parachute for the whole airplane, that is, attach a very large 'chute to it so that it will lower the whole ship slowly? About how big would such a parachute be, and would a special type be required?*

Answer:—THE government have been experimenting for some time with just this sort of parachute, but according to recent advice, have abandoned the idea in favor of the cage or tray idea. In the latter system, the passengers of a transport plane are seated within a false cabin that can be lifted out of the ship entirely, taking the passengers with it. The parachute then lifts only the cage, and can be made much smaller than were it required to carry the whole ship.

It is difficult to estimate the diameter of a 'chute large enough to carry from 2,000 to 40,000 pounds dead weight, without going into rather complicated calculations. For a large transport ship, it would be our guess, that the diameter of such a parachute would not be very far from 100 feet.

* * *

**All questions of general interest on any phase of aviation will be answered authoritatively by Popular Aviation's Technical Staff.**




A cumulus cloud is formed by updrafts of warm moist air.

QUESTION:—L. V. Fraley, Montreal, P. Q. *What is the purpose of the new variable pitch propellers that are now being used and experimented with? Do they give more power, or do they have some other advantage?*

Answer:—WHEN a rigid blade propeller is used, there is only one value of the r.p.m. at which it develops its highest efficiency. At any other speed, above or below normal, the efficiency falls off and less of the engine output is delivered for the propulsion of the ship.

It is easy to see, therefore, that if the propeller is made with a variable pitch, as might be attained by turning or twisting the blades, then it can be made approximately as efficient at all speeds.

Take a short pitch propeller, for example. This will allow the engine to speed up, and deliver more power when the ship is taxying or flying slowly. However, the engine would run too fast with such a propeller at high ship speeds, and it is likely that the speed of the tips would travel so fast that there would be a considerable tip loss.

Take a long pitch propeller on a ship flying slowly or traveling over the ground. The pitch is so heavy that the engine cannot build up its full speed, and as a result, there is very little thrust. If the ship were equipped with a variable pitch propeller, then it could be adjusted to short pitch while the ship was moving slowly, developing full thrust. Then, when the flight speed increased, the pitch could also be increased to hold the engine r.p.m. down to normal.

* * *

QUESTION:—Anton Schmidt, Tulsa, Okla. *What are the four principal cloud groups by name? We ran across an examination question like the above, and were unable to locate a book that would give us the necessary information. What books deal with clouds and the weather?*

Answer:—THE highest clouds are the filmy white Cirrus clouds. Below them are the billowing woolly white clouds called the Cumulus clouds. Below the Cumulus clouds is a thin gray layer called the Stratus cloud, and lowest of all, are the black woolly clouds, the Nimbus. There are various intermediate clouds, such as the Alto-Cumulus, Cirro-Stratus, etc. The books treating of clouds and weather are the books treating of Meteorology.

* * *

QUESTION:—Fred J. Kemp, Gary, Ind. *In glider practice, I understand that they use "targets." Just what are these targets and how are they used?*

Answer:—IN LEARNING to glide, it is essential that the glider be held closely on a prescribed course so that the rudder and other controls can be handled accurately. To this end, a large white sheet or piece of paper is located at a distance from the launching point so that the pilot will have something to aim at. This white marker is the "target" of which you speak. Where an attempt is being made to glide across a valley, for ex-

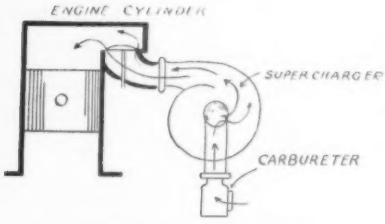
A marker or target is used to insure straight flight. The start is made against the wind.

ample, a large target is placed in full view from the elevated launch point.

* * *

QUESTION:—J. K. McDonald, Lexington, Ky. *Kindly explain the elementary principles of the supercharger used on aeronautic engines for high altitude flying. Just how do they function and what is their purpose? Can this same principle also be applied to automobile engines successfully and has it ever been tried?*

Answer:—THE output of any internal combustion engine is largely determined by the weight of the fuel taken in on the suction stroke. The weight of the fuel in turn is limited by the amount of air that can be taken in for burning the fuel. Thus, if the air pressure is




**Elementary supercharger system.**

low, as at high altitudes, then only a small amount of air will be taken in on each stroke—reducing the permissible amount of fuel.

Now, if we can increase the amount of air taken in by compressing the air or mixture, in a special compressor known as a "supercharger," then we can increase the output of the cylinder correspondingly. We can hold the power output up to normal, or else actually increase the output above that possible when the engine draws in its charge at atmospheric pressure.

The diagram, shown herewith, is a schematic diagram showing the elementary principles of the supercharger. Here we have a pressure blower, called the "supercharger," which draws in a charge of the mixture from the carburetor and then forces this compressed mixture in through the inlet valve of the engine. The supercharger is driven by the engine, and as this takes a considerable amount of power, the actual increase due to supercharging is somewhat below the theoretical figures. Superchargers have been used for a long time on racing cars, but are not particularly desirable for private cars.

* * *

QUESTION:—Vaughn Parkes, Marshalltown, Ia. *What is the lift and drag of a wing, and what is the lift-drag ratio? Do these forces actually exist or are they only theoretical quantities?*

Answer:—AS shown by the attached diagram, there are three principal forces acting on an airplane wing in flight. First, we have the lifting force acting upwardly—equal and opposite to the total weight of the airplane. Second, we have the horizontal "drag" force which is overcome by the thrust of the propeller. The drag is made up of two independent forces, the dynamic drag that is a resultant of the weight supported, and also a minor drag due to the forward resistance of the wing itself.

The effectiveness of the wing—not its efficiency—is expressed by the ratio of the load supported to the drag force. Thus, if the total supported load is 2,000 pounds, and this is supported by a horizontal force of 100 pounds exerted by the propeller, then the lift-drag ratio is: $2{,}000/100 = 20$.

* * *

QUESTION:—T. F. Cramp, Omaha, Nebr. *What ship during the war bore the name of the "flaming coffin"?*

Answer:—THIS was the DeHavilland-4, or the DH-4.

* * *

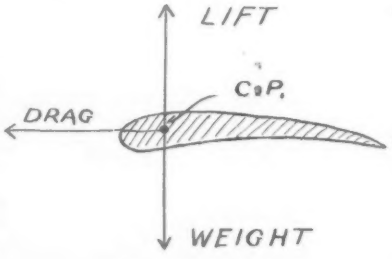
QUESTION:—G. G. Chiverton, Tulsa, Okla. *Will a muffler be practicable on the exhaust outlets of the engine or will it cause too much back-pressure? If possible, I would like to cut down some of the roar and noise that is so annoying with present day ships.*

Answer:—A MUFFLER is possible, but this will not cure all of the noise. The propeller is productive of much roaring within itself, and, further, it amplifies the engine vibrations. Again, the flat wing surfaces, tail surfaces and fuselage sides all act as sounding boards.

* * *

QUESTION:—A. Eriksen, Spencer, Ia. *Where can I get information concerning flying in the Army and Navy?*

Answer:—WRITE to the War Department and Navy Department, respectively, at Washington, D. C.




**Forces acting on wing.**

QUESTION:—Edward Gardner, Freeport, Ill. *Must all airplanes be licensed? Thus, if I built a single place light plane for my own use would it be necessary to license the ship?*

Answer:—WE QUOTE from paragraph (B), Section 2, Air Commerce Regulations Bulletin 27, as follows: "Aircraft used solely for pleasure or noncommercial purposes need not be licensed, although engaged in flying between states, but, at the option of the owner, may be licensed, in which event it must observe all the requirements of licensed aircraft. Whether licensed or not, all aircraft must display the assigned identification mark."

## Women Operate Aerial Taxi

GREAT BRITAIN'S first woman "businessmen" of the air have finished the first year's operation with a considerable profit and great enthusiasm. They are Miss Pauline Gower, daughter of Sir Robert Gower, and Miss Dorothy Spicer, both of London. They operate an air taxi and general joy ride business from the airdrome at Wallingford in Berkeshire, offering to undertake any sort of a trip or fly passengers wherever they might care to go.

Miss Gower, twenty-one years of age, is the pilot, while Miss Spicer, a qualified ground engineer, attends to all repairs and maintenance on the plane. Miss Gower first started her flying course eighteen months ago, obtaining her first certificate at the end of a six months course. A few weeks later she qualified for what corresponds to a transport license in the United States, her papers qualifying her to carry passengers for hire at any time, place or in any type plane.

The two girls live together in a tiny one-room cottage at the edge of the airdrome, arising each day at six a. m. in order to make the necessary inspections and care of their plane. The aim towards which they are working is a flight from London to India, which they hope to make at some time in the near future.

## Gives to Museum

ANNOUNCEMENT has been made that the first Autogiro flown in America will be presented to the Smithsonian Institute by Mr. Harold F. Pitcairn, president of the Autogiro Company of America, for permanent exhibit among the historic models of heavier-than-air craft that have signalized the development of aviation.

Museum authorities regard it as "the most valuable and highly prized exhibit in recent years . . . especially because it represents the first machine adopting different basic principles of powered flight since 1903, when the 'extended wing principle' was developed by the Wright brothers." For this reason the new accession will be given a place of honor in Power Hall, Washington, among the Institute's host of famous aircraft.

The machine, an Avro Autogiro, was originally an English biplane, early models of which were used previous to and during the war especially for training pilots. The fuselage of one of the later models had been remodeled into the Avro Autogiro when Mr. Pitcairn went to Europe in 1928, to negotiate with the Cierva Autogiro Company to bring the new craft to this country. The biplane wings had been replaced by a single small fixed wing, and the characteristic Autogiro rotor had been installed. A Wright J-5 engine was ordered for the machine from America.

## Gatty Invents Ground-Speed Indicator

THE novel drift and ground-speed indicator, which Navigator Harold Gatty invented and has tested to his satisfaction, is going to be made available for aviation in general.

Gatty has been in Washington, arranging with government officials for a government license on the instrument. Mounted in a navy plane, it has undergone several flight tests under the observation of the Bureau of Aeronautics, and has been found to be accurate to within a few tenths of one per cent.

The instrument allows a flier to calculate his drift and ground speed without using a watch or sighting prominent surface objects. Thus, over ocean or fog, the pilot can maintain his course accurately.

The instrument tested in Washington is the original one used in the Winnie Mae during the world flight. It weighs two and one-half pounds, but this can be cut down to one and one-half pounds.

Gatty also submitted to the government all data gathered on the flight to be reworked by the Hydrographic office. The Army Air corps is preparing to utilize this information with a set of slides based on the technique, instruments, charts and methods used for the instruction of its pilots.

---

## Baggage in the Wings

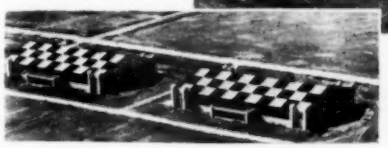
THE United Air Lines have devised a novel method of storing light baggage that formerly took up valuable space in the body. As will be seen from the photograph, light baggage is placed on shelves which afterwards are pulled up into the wings.

The great thickness of the modern monoplane wing makes it possible to accommodate a considerable amount of baggage in this manner, and it is said that the wings alone will accommodate 1,000 pounds of mail and the baggage of eleven passengers.

Baggage rack let down. This later lifted up into the wing.

## Randolph Field Trains Army Corps Beginners

Right: General layout of field showing arrangement of buildings. Below: Hangars with checkered roofs.



RANDOLPH FIELD is devoted to a special purpose—the training of young American manhood in the art and science of military aviation. Known far and wide by such names as "The Flying City," the "West Point of the Air" or the "Army Aeronautical Academy," its proper name is Randolph Field. It is the site of the Air Corps Training Center and the home of the Air Corps Primary Flying School.

The property occupied by Randolph Field comprises about 2,300 acres. It was acquired by the citizens of San Antonio and donated to the War Department when the site of a new field was being investigated. The field was named in memory of Captain William M. Randolph, Air Corps, U. S. Army, a native Texan, who, while Adjutant of Kelly Field, was killed in an airplane crash at Gorman, Texas.

Primary flying training was previously carried on at Brooks Field, San Antonio, Texas, and March Field, Riverside, Calif., but the school organization and equipment at these two schools was moved to the one larger central establishment. Advanced flying training is still carried on at Kelly Field, on the other side of San Antonio from Randolph Field.

The head of the Army's flying training system is Brigadier-General Charles H. Danforth, Assistant Chief of the Air Corps, who will make his headquarters at Randolph and from there will direct the training policies of the Air Corps. The Commanding Officer of Randolph Field is Major Frederick L. Martin, who previously commanded Kelly Field. Major Benjamin B. Warriner, Medical Corps, is Commandant of the School of Aviation Medicine.

While the total area of the post is almost four square miles, only one-fourth of this space is occupied by buildings. The building area of 600 acres is in the center of this reservation, while around it on four sides is the landing field area. Two opposite sides can always be used for flying training at the same time, according to the direction of the wind. Across one side, only, is the entrance road to the post.

Another innovation is the absence of many obstructing towers, masts and the like, which not only form an actual hazard to experienced flyers but an acute mental hazard to the fledgling pilot, intent on keeping his nose on the horizon and his wings reasonably level. The only tower is that of the Headquarters and Administration building, which contains the water tank, the office and laboratory of the field's weather bureau. Crowning the tower is the revolving beacon which guides the night flying pilot.

There are nine hangars each on two sides of the field, a total of 18 hangars for the 275 airplanes which will be on the field. Also two large airplane assembly hangars and large shop and repair hangars. All hangars bordering the field have their roofs painted a startling black and chrome yellow checkerboard pattern.

The architecture of the other buildings is the Spanish Mission type, and the construction is of stucco over hollow building tile, with red and varicolored tile roofs. Some quarters are bungalows, others two-storied buildings. Around the buildings and quarters are planted native shrubs and trees. There are close to 300 hangars, quarters, barracks, shops and other accessory buildings.

The total post population will be 1,700 military personnel—officers, students and enlisted men, and about 3,500 when one includes civilian employees and members of officers and noncommissioned officers' families. For their amusement there is a theatre in the Administration Building having a seating capacity of 1,000. Athletic fields are on the post for those in good health, and the last word in military hospitals for those who need hospitalization.

About $10,000,000 has been spent on buildings and in ground improvement. The aeronautical equipment to be used on this field (planes, shop equipment, machinery and tools) will amount to about $3,500,000. The roads about the post are concrete, paved aprons being installed around the hangars where the airplane engines are warmed up. Be-

(*Continued on page* 56)

## Laying Down a Smoke Screen in Maneuvers

DURING the recent war maneuvers in Italy, a sham bombardment of Milan was staged. This took on all of the aspects of an actual affray and was witnessed by thousands standing on the housetops of Milan.

One of the most effective maneuvers was the laying down of a smoke screen as shown by accompanying photograph. It is surprising what a great volume of dense gas can be obtained from a relatively small amount of powder.

The two airplanes are laying a smoke screen to cover operations.

The powder, generally a phosphorous compound, is contained in candles called "smoke bombs."

One pound of powder will render several million cubic feet of air opaque.

## Warplane Data Sheet for War Fans

MANY of our warplane fans often write to us requesting information regarding these old ships. Therefore we believe that the publication of a series of tables on this subject will be of great interest and service to these readers.

The accompanying table is the first of the series and gives the more important descriptive data of interest to the collector of photographs. The table also serves as a means of identification for the various types.

These tables were kindly supplied by Harold Wells of Oakland, Calif., whom we thank for his courtesy.

| MAKE AND MODEL | TYPE | ENGINE | H.P. | M.P.H. | PURPOSE | YEAR | COMMENTS |
|---|---|---|---|---|---|---|---|
| ARMSTRONG | 2 Seater Biplane | R.A.F. | 90 | 80 | Reconnaissance | 1915-16 | |
| | 2 Seater Biplane | Beardmore | 120 | 90 | Reconnaissance | 1916 | |
| | 2 Seater Biplane | Beardmore | 160 | 105 | Reconnaissance | 1917-18 | |
| | Sing. S't'r Bip. | Gnome | 80 | 75 | Pursuit | 1915-16 | |
| | Sing. S't'r Bip. | B. R. | 220 | 130-135 | Pursuit | 1918 | |
| AVRO | 2 Seater Biplane | Gnome and Le Rhone | 80 | 65-75 | Reconnaissance | 1914-15 | Later used as Training Plane |
| | 2 Seater Biplane | Gnome and Le Rhone | 100 | 75-80 | Reconnaissance | 1915-16 | |
| | 2 Seater Biplane | Gnome Le Rhone Clerget | 110 130 | 80-90 | Reconnaissance | 1916-17 | |
| | 2 Seater Biplane | Hispano-Suiza Sunbeam | 200 200 | 100-110 | Fighter | 1917-18 | |
| | Sing. S't'r Bip. | Gnome | 80 | 100 | Pursuit | 1916-17 | |
| | Sing. S't'r Bip. | B. R. | 180 | 110-125 | Pursuit | 1918 | "The Spider" |
| B. E. Bleriot. Later, British Experimental | 2 Seater Biplane | Renault | 60 70 100 | 50 60 65 | Reconnaissance | 1914-18 | 10 or 12 Models of This |
| BEARDMORE | 2 Seater Biplane | Sunbeam | 240 | 90-95 | Bomber | 1918 | |
| | 2 Seater Biplane | Adriatic | 230 | ? | Bomber | 1918 | |
| | Sing. S't'r Bip. | Hispano-Suiza | 200 | 110 | Pursuit | 1918 | |
| BLACKBURN | 2 Seater Biplane | Gnome | 80 | 60 | Reconnaissance | 1914-15 | R.N.A.S. mainly |
| BRISTOL | 2 Seater Biplane | Gnome | 80 | 70-75 | Fighter-Recon. | 1914-16 | |
| | 2 Seater Biplane | Rolls-Royce | 250 | 105 | Fighter-Recon | 1917 | |
| | 2 Seater Biplane | Hispano-Suiza Sunbeam | 200 200 | 120 | Fighter-Recon. | 1917-18 | The Famous "BristolFighter" |
| | 2 Seater Biplane | Rolls-Royce | 300 | 130 | Fighter-Recon. | 1918 | |
| | Sing. S't'r Bip. | Gnome Le Rhone Clerget | 80 110 130 | 85-100 | Pursuit | 1915-16 | The "Bullet" |
| | Sing. S't'r Bip. | Le Rhone Clerget | 110 130 | 90-105 | Pursuit | 1916-17 | |
| | Sing. S't'r Mono. | Clerget | 130 | 120-130 | Pursuit | 1918 | |
| CAUDRON | 2 Seater Biplane | Le Rhone Gnome | 110 60 & 80 | 55-65 | Reconnaissance and Training | 1914-15 | Balkan Front Mainly |
| (Made in both France and England) | 2 Seater Biplane | Hispano-Suiza | Twin 200s | ? | Bomber | 1915-16 | |
| | Sing. S't'r Bip. | Le Rhone | 80 | 70 | Pursuit | 1915 | |

## Ways to Hide from Searchlights

UP until a short time ago, no military plane had been able to shake off the beam of a searchlight, once it was caught in the glare of light. However, Capt. Lotha Smith and Capt. Ennis Whitehead have recently demonstrated that it is possible to dodge the beam under certain conditions, and are working out further plans by which searchlight dodging can be accomplished at all times.

One evening, during the maneuvers at Fort Humphreys, Va., a low swinging searchlight beam picked up Capt. Smith's attack plane at a time when Capt. Smith was flying very low. Suddenly Smith's plane fell out of the light spot and disappeared, much to the amazement of the searchlight crew. They were unable to pick up the plane again.

Capt. Smith had simply side slipped down behind a group of trees, and had then flown along so low that the light beam couldn't reach him. Side-slipping behind a screen is therefore one solution of the difficulty.

Capt. Whitehead gave another demonstration on the next night, but under different conditions, for his little attack plane was at an altitude of several thousand feet when the beam picked him out of the darkness. Capt. Whitehead nosed over and came down in a vertical dive while trying to shake off the spot. However, it followed him down for 3,000 feet before he managed to escape.

Instead of pulling up and leveling off, as those on the ground expected him to do, Whitehead jammed the stick against the dash and then went over on his back in half of an outside loop. When on his back, he flew away in the opposite direction to that which he would ordinarily be expected to take, and thus the searchlight crew were fooled again. They lost him entirely and did not again pick him up. These are the only two cases where planes, once spotted by the light, escaped into the darkness.

## Ski-Planes in Iceland

ICELAND, for the first time, is to have winter air service. Ski-equipped planes will ply regularly among the towns of the island this winter, carrying mail and passengers. The Icelandic Air Transport company, which is providing the service, also has a flying ambulance and leases planes to native fishing corporations to search for herring.

## Army Has Fewer Accidents

THE Army flew 43,964,000 miles during the fiscal year 1931 with only 26 deaths and the loss of 23 planes, a great improvement over 1930, when 52 lives and 41 planes were lost in flying 35,600,000 miles.

# Practical Lessons in Flying

*by* JOHN B. RATHBUN

Bob and Ed try out a mosquito plane with very satisfactory results.

BOB, the flight student, had completed his first ride in a "closed job," or cabin-plane on the day before, and was anxiously awaiting the arrival of Ed Keith, his instructor. While he had felt previously that a closed job was a sort of a ship for a parlor snake, he now understood that this all-weather ship was a distinctly flying different proposition than the old O.C.'s that he had been trained on up to this point.

He was looking her over, more carefully than he had an opportunity to do the day before, when Ed, the pilot, walked up and greeted him. He was anxious to get rolling with this new toy, just to get the feel of her, and turned around with:

"Well, Ed. Do we take the pretty little limousine out this morning or are we going back to hard work with Old Stiff Tail No. 7? I feel delicate this morning so I wish we could go out in this air-tight crock to save me from a few chilly breezes. What do you say?"

Keith smiled at this, for he understood what was in Bob's mind. He knew the boy was looking for new experiences, and that when he tired of the novelty, he would be clamoring for the old O.C. again.

"Sure," said Ed, "We'll take a little ride in the show-case if you can't get along without it. So far as the ship itself is concerned, I had just as soon side-step it—this morning in particular—but there are a couple of new facts about flying a cabin that I would like to call to your attention.

"You know, Bob, that flying a cabin-ship is getting pretty close to flying blind—in a way. You haven's got the old wind-stream to remind you of certain things, and you'll look at the instrument board oftener than you did before. However, once you get the feel of a cabin ship, you'll not pay so much attention to the dials."

Bob, in his impatience to get started, returned, "Well, explain about the instruments after we take-off, I can understand them better then, anyhow. Theory is all right, but practice is worth a ton of theory. You ought to know that—you sprung this crack on me yourself."

"Yeah? Well, just the same, and whether you like it or not, we'll do our little lecture stunt right here on the ground before you start running up some more air-time at our expense. The place for ground course instruction is on the ground. Savve?"

With a disappointed sigh, Bob resigned himself to the inevitable and put himself, once more, into the ground student's attitude.

"Well," began Ed, "There is a whole lot of difference in opinion on the subject of cabin-ship training. Many start, just as we have done—started out with the preliminary training in an open ship and then ended up with a cabin-plane. However, there are certain instructors, and they are growing more of this opinion lately, that training should begin on a cabin job and finish with an O.C. crock. These last fellows are right—in one way—but personally, I favor the road that we have traveled."

Banking around a turn properly is one of the most important flying operations learned by the student.

"What do you mean—start with a cab?" asked Bob. "What's the difference where you start as long as you finish?"

"You see it's this way," answered Ed. "A cabin generally proves somewhat more difficult to handle than an O.C. There's a new saying going around to the effect that, 'A man trained in a cabin-ship can operate any open job, but not many men trained on open jobs can fly a cabin-ship.' And there's something in that."

"And, so that's the way of it," said Bob. "Well, fire away and let's get going before we have to do some night flying."

BOB had started for the big cabin-plane, leading the way for Ed, but Ed beckoned him back and started to walk in the opposite direction, much to Bob's surprise. Then Bob ran and caught up with him, wondering what it all meant and why Ed was grinning as he always did when he sprung something out of the ordinary.

"I'm going to give you the surprise of your life, this morning," explained Ed. "You licked your chops, and thought we were going to take that DeLuxe up again for a trainer—didn't you? Well, we're not, so curb your impatience.

"You and I, sweetie, are going to take up that little 'skeeter' cabin standing there in the doorway—it's more economical than to crack-up the big job. When you can fly the baby cabin satisfactorily, then I'll give you some time on the palace car—but not before. We're not going to wash-out that sweet crate on a beginner—believe me."

In the meantime, the ground-crew had rolled out the little ship, and a nice little ship she was. Just like a big one, but reduced in scale. Just the thing for training at a reasonable cost, providing the student hadn't absorbed big ideas. She was new to Bob, but one quick glance showed him that she was all airplane from her tires up to the wings.

"There stands something that flies well, and don't cost a fortune, either," remarked Ed. She'll not eat you out of house and home like the big ships, and when you crack her up a bit, it won't ruin you. She'll do her 30 miles on a gallon—easy, plenty of room inside, and she is a sweet one to fly. They bought her on my recommendations, and there'll be a flock of them around here if I have my way about it."

"Pretty classy little job, I'll say," was Bob's reply, and he meant it. "I'll bet, though, that she'll jump around like a Mexican bean in rough weather, and it will be like driving a Model "T" on a muddy road. I'll bet the pilot gets plenty of exercise jerking the stick around."

"Nothing of the sort—forget it," was Ed's response. "She handles mighty nice, and when it comes to exercise, you will find that she don't tire you out half as bad as the collection of crates you have just been flying. She lands slow, about 20 or 25 m.p.h., and she takes off like a balloon in only a few feet. Just because she's small, don't get the idea that she can't do her stuff."

"And just one thing, before you start winding her up," said Ed. "Don't forget to watch your air-speed meter closer than you have ever watched it before. In the first place, she loses speed quicker than a big ship, when the engine stops pulling, and again, she has less speed to lose.

"All right, wind her," ordered Ed.

The little engine started firing promptly and quickly warmed up.

After seating himself inside the cabin, Bob was surprised to find how roomy it was. When Ed finally opened her up, she ran a very short distance and then lifted off without the slightest difficulty. They cleared the trees on the east end of the field by many more feet than they had ever cleared them before, and Bob was thoroughly astonished at the performance put up by the mosquito plane.

"Well, she's reading about 70 m.p.h.," said Ed, "and now watch carefully while I bank around that turn. Notice your position, and the way that you are sitting before I give her the rudder."

One of the larger enclosed ships, the Lockheed "Orion." The flying of this type of ship is the problem that Bob is now facing.

THE fact that Ed had properly banked the ship for the turn was proved by the fact that Bob's position was not disturbed in the least. It was just like a bank in any other machine, but when in the open ship, Bob had not paid so much attention to the feel of the turn as he did now. He sat still upright, as before the turn, the only difference being that he seemed to be pushing down on the cushions more than before.

"Now, tell me what's wrong in the picture," asked Ed, as he started another turn. "This is the kind of turn that I expect from you—the first time—so feel it out and tell me where I committed the error."

Around the turn she went, but now Bob found it difficult to sit straight in his seat. It seemed as though someone was trying to push him over toward the outside of the turn.

"Well, give one guess, and we'll find out what you know."

Bob, after all of his experience, quickly solved this problem. "You didn't bank up enough for that one, and we went into an outer side-slip."

"Correct to a hair," agreed Ed. "You see, I made a sharp turn without sufficient bank, so that instead of pushing you down harder in your seat, as it should have done, the centripetal force tried to throw you out of the window instead. Now watch me this time, and tell me all about it."

They turned in the same direction, this time, but Bob fell over toward the inside of the turn until he struck Ed's shoulder.

"Inside side-slip, too much bank," announced Bob.

"Yeah, and that's not all the story—either," said Ed. "If you had been watching the air-speed meter, you would have seen that the needle went down to about 30 m.p.h., or in other words she was nearly in a stall. Her nose was up, you should have noticed that. The engine was pulling hard and you must have been leaning against the back of the seat harder than before."

"Well," Bob defended himself. "I didn't have the stick in my hand or I would have felt the controls go flabby. I'm a stick flyer—not a clock watcher."

"Here are the controls, then, fire away," ordered Ed. "But just the same, do what I tell you and watch that pointer. You will fly by feel after while, but now that it is just so much talk. Now, point straight over to the shoe factory stack, and then start a right hand turn. If you are as good as you say, this turn should be a darb."

"Now watch me," Bob boasted. "Around we go, and if you have your eyes shut you will never know the difference."

This time, however, Bob over-estimated his ability, and there was a sharp tug toward the right that told of an outer side-slip—and a good one. Ed grabbed her, and brought her up where she belonged, completing the turn.

"So! You are a stick pilot, eh? Her nose was up and we had all of the makings of a nice mess. Is it part of your religion to keep your eyes off the air-speed meter, or are you just trying a little hooey on me? You'll have to put muscilage on your pants if you expect to stay in your seat after that kind of a performance. Now, try it again, but don't put so much English on her as you did the first time.

BOB tried it again, with somewhat better success, but he stlil had something to learn. Somehow, after his experience with open machines, the relation between the rudder and the ailerons seemed different, and this was what was getting him all messed up on the job.

Confident, after the second turn, that he had it all doped out, Bob made another turn and this time the pull on his body was in the opposite direction. He piled up against Ed again, and once more the pilot grabbed the stick and straightened matters out. This was due to an ambition to over correct his first fault.

"A little more of that, and we would have had a nice spin," remarked Ed. "And a spin in a cabin ship is something that you haven't tried out yet, although you seem to be pointing in that direction as fast as you can. We have enough power for ordinary purposes, but still you're not flying a pursuit job by any means. Just give that little engine a break once in a while, and nose her down for a change instead of sticking her nose up on the turns.

"Now there is one little rule that applies to ships of the cabin type and I will give it to you in full. It's short and simple.

"Push the stick away from the side that attracts the weight of your body.

"To cure a skid to the left, give right stick, right rudder, or both.

"To cure a skid to the right, give left stick, left rudder, or both.

Of course most of the larger ships, and some of the mosquitoes as well, are equipped with "bank-and-turn" indicators which show directly whether the banking is correct. In this case, Ed preferred to teach control by the senses.

After several more trials, making turns to the right and to the left, Bob mastered the trick and put in a pleasureable half hour with the lightplane.

It really flew very well, and at times it flew "hands-off," just as steadily as a big ship. It was less tiring to handle, and Bob was quite pleased with the experience. He even felt that it would be a more practical possession than the big tub that he had formerly coveted in the early days.

Now, in making the landing, he was quite surprised to see how slowly it drifted along under Ed's hands. And when it contacted, it rolled only a few feet and then came to a dead stop. Old No. 7 rolled and rolled after contacting, until sometimes it seemed that they covered half the field this way.

Landing was a little strange to Bob, largely for the reason that he was so much closer to the ground, but this difficulty was soon overcome with a little practice. He anticipated trouble on the rougher ground outside the runways, but this was not found true in fact.

After this experience, it was safe to tackle a larger ship, and that is exactly what happened on the following day. When, after a few takeoffs, Bob could handle the big cabin ship, he almost felt as though he were ready for a first-class transport license.

XUM

## A Revolutionary Parachute

A PARACHUTE that opens instantly, and which is only half the size and weight of those now in use, is attracting a great deal of attention from aviation experts.

This is the invention of Oswell A. Baker of Alhambra, a well contractor who, strange to say, worked out the idea while engaged far underground. The new chute has already made more than 300 successful drops ranging from 3,000 feet to as low as 45 feet.

Its outstanding features are its small diameter, its instantaneous opening, its almost entire lack of drift and the fact that it has little or no drag after landing. It weighs less than ten pounds, packed ready to wear, and supports from 50 to 175 pounds with equal steadiness of action.

The new parachute is of peculiar bulbous construction with a smaller auxiliary chute halfway down the short shrouds. This "bottom leaf" comes out of the pack first and throws the shrouds out into their proper place, thus avoiding entanglements in the quick opening which occupies less than the first ten feet of the drop. It also acts as a shock absorber in breaking the initial impact.

During the drop the smaller chute carries its portion of the load. The small diameter of fifteen feet for the upper chute and five feet for the lower chute, with shrouds but nine feet six inches long, eliminates most of the usual parachute drift.

A parachute of this type, it is claimed, eliminates many of the dangers now experienced with the standard types of chutes, and is therefore well worthy of consideration. The photograph shows the construction.

The shrouds run over the top panel and down through the center, holding the bulging top down and creating a higher compression under the chute and with a partial vacuum on top, assisting the quick opening feature.

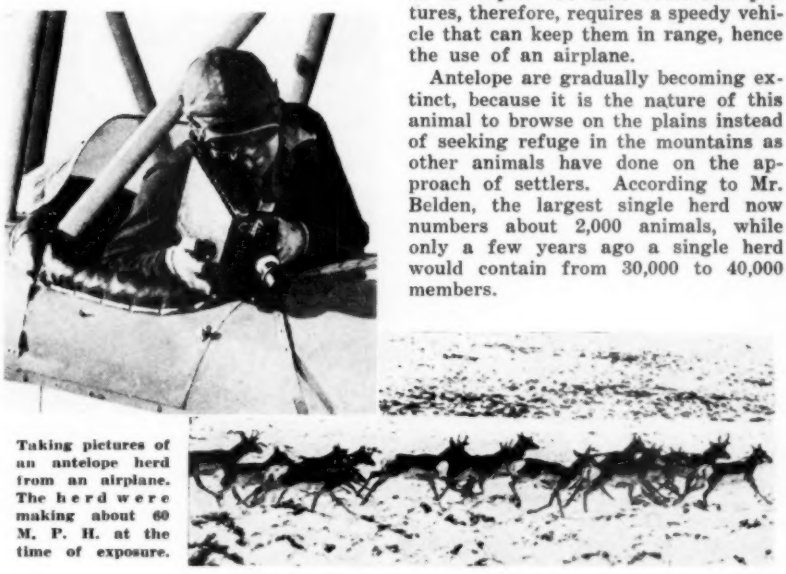
Ground tests on the Baker parachute, showing its construction.

## Shooting Antelope With a Camera From a Plane

HUNTING antelope with a camera, and using an airplane to keep up with the fleet little animals, is one of the most enthralling of sports, according to Charles J. Belden, Pitchfork, Wyo., who has taken the accompanying pictures.

Antelope, be it known, are the fastest four footed animals that travel the earth, and have been repeatedly timed at 60 m.p.h. To take successful pictures, therefore, requires a speedy vehicle that can keep them in range, hence the use of an airplane.

Antelope are gradually becoming extinct, because it is the nature of this animal to browse on the plains instead of seeking refuge in the mountains as other animals have done on the approach of settlers. According to Mr. Belden, the largest single herd now numbers about 2,000 animals, while only a few years ago a single herd would contain from 30,000 to 40,000 members.



Taking pictures of an antelope herd from an airplane. The herd were making about 60 M. P. H. at the time of exposure.

## Progress of Aviation Insurance By Years

IN THE early days of flying it was impossible for a pilot to obtain life insurance on any terms whatever. The progress which has been made and the possibilities for the future are seen from a calendar arrangement something like this:

1918—Practically nothing was available in the way of life insurance for people flying either as passengers or pilots.

1920—About this time one large company offered a limit of $2,000.00 insurance on any pilot at an extra rating of $90.00 per $1,000.00 of insurance annually. This premium was prohibitive and the effort received little serious consideration.

1923—Around this time some companies began to feel their way along on underwriting pilots and passengers who did a very restricted amount of flying, at an extra premium or "loading" charge of $25.00 per $1,000.00 of insurance annually. While this rating was high the proposition had some usefulness and represented a definite step forward.

1925—A new type of specially restricted policy without extra premium was introduced, and for a time it served a real use. The arrangement was that a flier who desired to insure his life might do so by accepting a special "rider" attached to his policy, which provided that in case of death through participation in aviation only the premiums paid, instead of the face value of the policy, would be remitted to the beneficiary.

1926—A clause similar to the above was issued, but the restriction was limited to ten years, after which time the individual would automatically have full coverage without extra premium.

1930—It now became possible for persons using airplanes to obtain regular policies of life insurance with extra premiums ranging from $5 to $35 per $1,000 of insurance annually, depending upon whether they flew as pilots or as passengers, and upon how much flying they had done in the past and how much they were likely to do in the future. Most of the men interested in the problem then began to base their calculations on the number of flights taken, that is, the number of takeoffs and landings instead of the number of hours spent in the air. It was recognized that the greatest danger in flying is connected with takeoffs and landings, and especially forced landings.

1931—A real evidence of progress is to be seen in the announcement recently made by one of the largest of the risk companies, that persons limiting themselves to flying over regularly established air transport lines will be accepted without extra premium, provided their activities do not entail more than twenty actual flights (takeoffs and landings) per year, and that they will be accepted with a low extra charge graded upon the number of flights taken in excess of that number.

XUM

## The Round Robin Club

**A correspondence plan for POPULAR AVIATION readers.**

ROUND ROBINS are sure moving around these days. The bundles of letters are arriving more regularly than for some time past, and the interest is growing to rather inconvenient heights for the comfort of our stenographers. But don't let this deter your ambitions, fire them in, and the faster you pitch them over the plate, the better we like 'em.

Old Club No. 2 has at last put in its appearance, just as we are going to press, and this is like meeting an old lost friend. She got mixed up in the shuffle somewhere, but finally crawled out of the weeds. No. 2, let it be said, is a good warm club under normal barometric pressures.

And now we have two more clubs, all sorted out and ready for the first round. They are listed below, names, addresses and everything. All they need is a good send-off from the office to get them going around and around. No. 7 has already started a ruckus, and is more or less trying to debate something—I haven't found out yet what it is all about—but it's something. Maybe after the first clouds of dust blow away, I'll be able to let you know what vital throbbing is taking place.

Last month we promised to turn our authoress loose on you, Miss Dorothy Dean of No. 2. But we had so much stuff to jam in, and so little space in which to store the jam, that we were again compelled to leave her out. I'm sorry for this, but promise you it won't happen again. I can't make out whether Miss Dean is telling a true story or whether she is just displaying the license of authorship. Time will tell.

Now, I want to tell you how to grease the skids when the correspondence of your club gets stalled. If the letters are not received within a reasonable length of time, write to us about it and give the date on which you mailed the letters as well as the name and address of the member that you mailed them to. This being done, then we can boost things along and speed up the circulation. You know, it only takes one laggard to tie up the whole parade.

I wonder if any of you have thought of using the air mail? It's not a bad idea to support the institution that you are boosting, even though it does cost a few cents more than the ordinary postage. It's rather interesting to know that these letters have been pushed along by the mail hoppers who have been described so graphically from time to time by Cap Purcell.

I've had about a dozen letters asking what "round robin" means. I can understand the "round" part of it, but the "robin" part is too stiff for me. I stalled the issue by shoving it over on the poor old Q & A Department. They were very polite—Oh, exceedingly so—but they haven't made any reply so far. I guess this was a little too much to expect anyway. If anybody can think up a good stall for this question, ship it to me quick, help—help!

The members are of all ages, these Round Robins. The youngest is 11 years, and the other day, a bird came in who meekly acknowledged that some 57 years had passed over his head. And so we say, that this club is really and truly open to everyone who is interested in aviation and who can push a pen with a moderate degree of alacrity.

To join this club, and we will heartily welcome you, simply sit down and mail your request to the Round Robin Club, POPULAR AVIATION, 608 S. Dearborn St., Chicago, Ill. We'll do the rest. Thank you.

In the following list are the new clubs and their membership, including the addresses. Member No. 1, of course, is POPULAR AVIATION, and it is this member that starts all of the clubs off on their career. Come on in.

And another thing, Leonard Gelardy, of Club No. 7, has moved from New Brighton, Staten Island, to 434 Westervelt Ave., Tompkinsville, Staten Island, N. Y.

CLUB NO. 9

(2) Eugene R. Johnston, 1420 Otto St., Franklin, Pa. (3) Kenneth Siman, RFD 43, Medina, O. (4) Chester Kwiecinski, RFD No. 1, Bangor, Pa. (5) Leonard Greenberg, 701 W. 179 St., New York. (6) Alrin Wiley, No. 404, Mullen's W. Va. (7) Sril Perlman, 1225 Cottman St., Philadelphia, Pa. (8) Harry Queal, Alexandria, N. Y. (9) Lester Kresanek, 9041 S. Loomis St., Chicago, Ill. (10) Harold Bearns, L. B. 297, Grand Rapids, Mich. (11) Lawrence Worland, Mercyville Sanitarium, Aurora, Ill.

CLUB NO. 10

(2) Lyle Fleming, Nampa, Idaho. (3) George Schwartz, 246 E. 112 St., New York. (4) Willard Groseclose, Box 186, Wenatchee, Wash. (5) Raymond Reed, Wonewoc, Wis. (6) Erwin L. Mathews, 1140 Harrison Ave., Crystal Falls, Mich. (7) J. E. Richerson, R-3, Box 83, Hico, Texas. (8) Raymond Fisher, 349 Walnut St., Johnstown, Pa. (9) James R. Hudgins, 844 E. Arlington Ave., Fort Worth, Texas. (10) Miss Flora Jean MacDonald, Box 564, Red Deer, Alberta, Canada. (11) Raymon E. Alexander, 3413 Carondelet St., New Orleans, La.

We have had a number of suggestions from the members of the club regarding subjects for a debate. Why not start up with the engine problem—"Resolved Air-cooled engines are more satisfactory than the liquid cooled type"—And if you come to any definite conclusions let us know. Maybe we could find space for the dope in the magazine with all due credit to the debaters.

## Goes into Training for Japan Flight

JUANITA BURNS, 25-year-old aviatrix, has her own ideas about training for long distance flights. Miss Burns, who has announced plans for a lone flight in the summer of 1932 from Tokyo, Japan, to Seattle, Wash., and thence to Dallas, Tex., explained it this way:

"You've heard of the boy who lifted a growing calf each day until he finally could lift a cow? Well, that's my system. I shall sit down beside a roaring airplane engine. When I begin to get drowsy, I will shut off the engine and call it a day. The next day I will sit a little longer—and so on until I can stay awake 40 hours or so. Simple, isn't it?"

Miss Burns was in New York recently negotiating for the purchase of a plane, which she will ship by boat to Japan this winter. She is going to call it "Miss Olympia 1932," in honor of the Olympic games to be held in Los Angeles next summer.

## Aerial Radio Control

Radio control clock.

RADIO communication between planes and ground stations, between two planes, or between two ground stations on the United Air Lines system, is conducted on a minute-to-minute basis, controlled by the clock dial pictured here.

Each minute, throughout each hour, is allotted to communications between particular planes or with certain ground stations.

Beginning on the hour, communications are exchanged between Oakland, Cal., and Cheyenne, Wyo. Then, eastbound Boeing planes on the Chicago-San Francisco division report for one minute, finally, Boeing westbound plane for one minute.

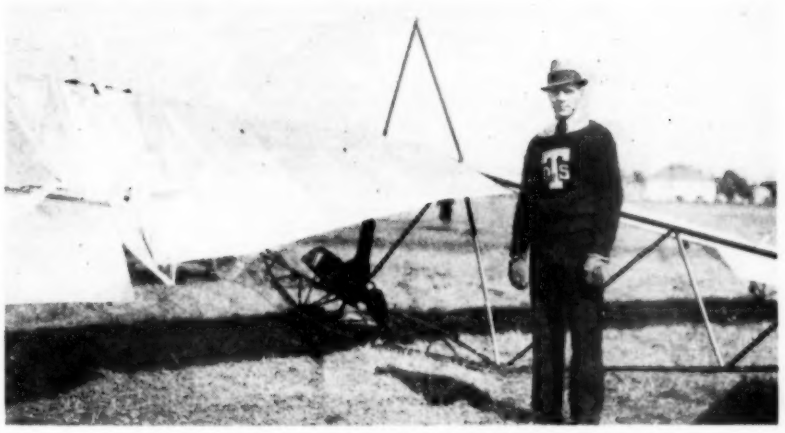
The cycle is completed every twenty minutes, so that each plane is heard three times each hour. Only twelve minutes of each hour are not assigned, and these twelve are retained for emergency messages or extra-routine communications.

# What We Learned From Crack-Ups

*by* ARTHUR L. LAWRENCE

*Sometimes a few accidents teach more than volumes of theory, says the author. A few wrecks, requiring a considerable amount of repair work, makes the pilot more careful.*

+ + +



Just after a crack-up, showing the wing somewhat messed up.

WE WERE filled with confidence in the belief that we had at last evolved a fool-proof system of glider instruction. Therefore, I directed one of the club members, who had made a number of perfect straight auto-towed flights the day previously, to attempt a slight left bank and turn after releasing the tow rope. Seated in the glider, he rehearsed the maneuver while I outlined what he should do.

With some 300 feet of rope stretched between it and the glider, the tow car started. Riding on the running board of the roadster and watching the ship and pilot, I quickly became worried when I saw the primary kiting dangerously. It was a fairly calm morning, and, for the person who hadn't learned all there is to know about the difference between air and ground speeds, it was no time for taking even the slightest chance.

I shouted to the driver to speed up and gave the usual signal to the pilot to level out. Before the glider was out of danger, I saw the tow-rope drop. The pilot had pulled the release.

To the horror of all of us in the car, we saw the pilot start to turn—in a stall! The ship spun rapidly, it dropped surprisingly fast, and crashed with a roaring sound of tearing fabric and snapping wood.

Not more than two seconds later we were jumping out of the machine beside the wreckage. Imagine our relief when we saw the pilot come out from behind the mangled craft, still able to stand on his two feet. It was hard to believe that he had escaped uninjured.

But we eyed what had been a good primary glider with dismay. The left wing was completely demolished and the steel-tubing fuselage was badly bent. There was still other damage done which, as a matter of fact, took us almost two months to repair and did not leave enough out of a $100.00 bill to buy more than a few bags of peanuts.

The fact remains that we have learned more lessons about how to conduct glider training from the major and minor crack-ups which we have had than from any other one source. There is a great deal of difference between theoretical knowledge and practical experience. Each time we have had a crack-up (and there haven't been so many of them) we have analyzed the causes, evolving something better and adding to our practical experience.

Our first crack-up came after only five flights when we first started gliding over a year ago. Since then, club members have made about 1,500 flights. Our log book now shows over 500 tows since the last smash by a pilot. The ship is still going strong and was recently licensed by the Department of Commerce.

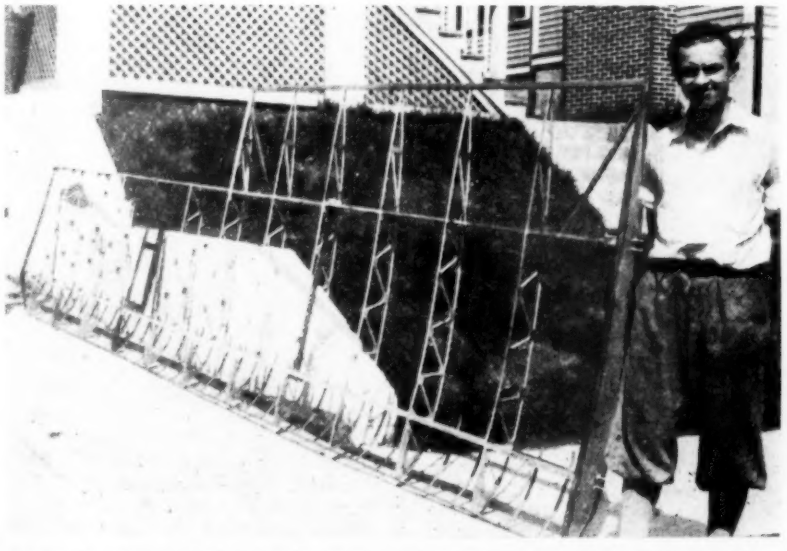
Before telling what we learned from the crack-up, first described, I want to tell of one other. Last winter, soon after we switched from shock-cord launching to auto-towing as a means of instruction, a new member had an experience. He laid the ship up for a month and a half, though he did not hurt himself.

Still unfamiliar with the dangers of improperly conducted auto-towing, I instructed the novice in the use of the controls, let him practice the aileron control by balancing the ship's wing in the wind and then hitched a 100-foot rope between the glider and tow car. With a final admonition to hold the stick well forward so that there would be no danger of his taking off, I climbed onto the running board and we started.

The would-be glider pilot was having trouble. He was over-controlling badly, and the ship swayed from side to side while first one and then the other wing skid dragged.

A sudden gust of wind came at the same time that the novice inadvertently pulled back on the stick. Up shot the

(*Continued on page* 49)



Showing the wing repaired and ready for re-covering. The smile indicates some more gliding in prospect.

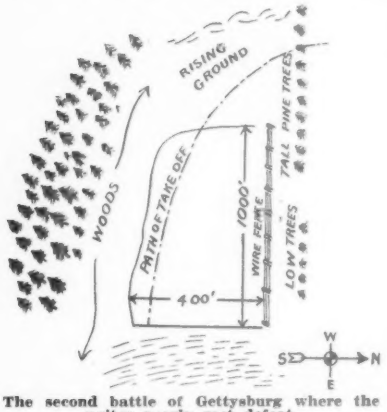
# Landing and Take-Off Problems

*by* Lieut. Commander D. W. TOMLINSON

Many landing and take-off crack-ups can be avoided by a more careful study of the terrain and wind.

IF MY memory serves me correctly, a great many airplanes washed out because the pilots made landings in fields without first giving thought to the problem of escape—before getting themselves into a trap.

In the old days of the OX-5 Jennies and Standards, it was a very simple matter to land in a field from which the plane could not make a safe take-off. In fact, it was done every day.




**The second battle of Gettysburg where the writer nearly met defeat.**

Many a budding pilot, staggering across the landscape, picked himself a nice field in which he *landed* safely—and departed on a plank.

As a final gesture, someone then touched a match to the remains of the plane—and the curtain was rung down to the tune of "Too small a field." Sometimes, it really was the field which was to blame, but oftener, it was plain lack of foresight and experience.

The advent of lightplanes, and their widespread use today for pleasure flying, means that there are now many hay fields, cow-pastures, mountain valleys and meadows which are due to receive aerial visitors. There is no joy in hopping from one commercial field to another. On the contrary, it's a bore. One commercial field is the same as another; with orthodox signals indicating the manner of landing and the runway you are to use.

Once on the ground, the frantic waving of flags then indicates where you are to park your jillopy, or perhaps it merely indicates that you have committed some fatal bungle and are in line for a bawling out by the field attendant in the brass hat. Then, too, about the time you are safely parked, the plane alongside you is ready to go out—and in so doing, blows the cockpit full of dust and wrecks the wife's ensemble.

The next, and logical, step is for the private flier to hit out on the gypsy trail—with the commercial aspect entirely absent. He desires to escape from the turmoil of the city. He has taken up flying to get away from the insufferable traffic encountered on the highways. The problem which confronts the private flier is therefore the problem of finding fields suitable for his particular plane at the places he wishes to visit. And, as he begins to search about for such fields and finds them, let him bear in mind one thought before he lands: "How am I going to get *out* of this field—after I get in?"

Personal experience is often costly, and the next best thing to do is to profit by the experience of others. I'm not bragging about some of my own experiences—but they sure did teach me a lesson!

A Sunday afternoon, some seven years ago, found me approaching Williamsport, Pa. I was headed for Batavia, N. Y., flying a good old OX-5 Jenny. It was a fair old crate which I had picked up to use in barnstorming western New York. The prop was an old club that wound up about 1,300 r.p.m. on the ground. This allowed me to cruise economically at close to 1,200 r.p.m. To my sorrow, however, I had discovered on taking off from a hayfield at Gettysburg, that my take-off out of cross-country fields was darned slow.

IT WAS necessary for me to stop at Williamsport for gas. An itinerant flier at Baltimore had told me where to find a commercial field west of town. Imagine my embarrassment when I found this field now contained a fine stand of corn! There was nothing to do but make myself a field—and this I set about to do without loss of time as I was anxious to get home.

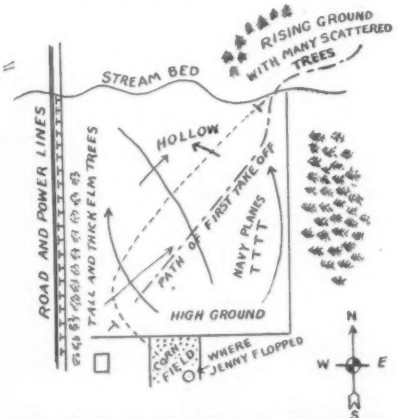
I could find no fields on the west side of the city close enough in to suit me. On my first swing around, on the east side and south of the Susquehanna River, I spotted a freshly cut hayfield at the foot of the east and west ridge of the Alleghanies which formed the southern boundary of the river valley. From my observation of windmills, trees and tall grain, I knew there was little or no wind on the surface.

Making a low circle of the field, I decided it would be possible to land heading west as there was an unobstructed approach over a considerable area of swamp ground. It was the nearest spot to the city which offered any possibility of landing. Quick service was what I wanted. The Jenny came down to a smooth landing.

Before my wheels had touched the ground, the entire countryside had assembled in that field. I had no sooner landed, however, than I realized that my choice of a field was not without its disadvantages.

There was no wind at the moment, and so long as it remained calm, I knew I could just make a takeoff to the east and clear the fence at the edge of the swamp. But should a westerly breeze spring up, I knew I was sunk, for the rising ground at the west end of the field was more abrupt than appeared from the air. And, again, the line of pine trees at the northwest corner (parallel to the north edge of the field) reared their heads to a disconcerting height.

The farmer who owned the field drove me into town for gas, and all the way in, I kept praying for one thing—that no westerly breeze would spring up in my absence! It took the garage people the usual interminable time to find cans for transporting gas back to the plane. The result was, that when I did get back, an hour had elapsed. Sitting up on the top wing, as I poured in the gas, a cool breeze suddenly fanned my perspiring face. My heart came up on my tongue and sat there; for the breeze was from the west and was rapidly increasing in strength!




**Scene of the first incident at Williamsport, Pennsylvania.**

Once more I examined the situation—something I should have done before landing. A takeoff directly to the west now seemed impossible. There was just no hope of the Jenny clearing either the hill or the pine trees. If

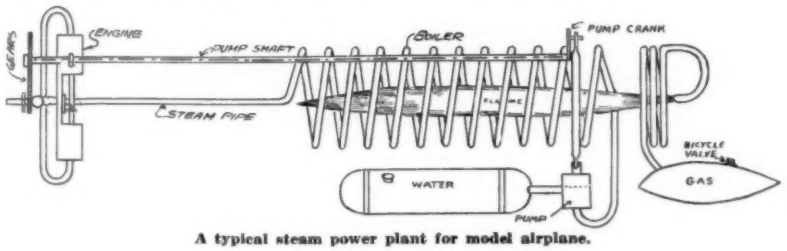
(*Continued on page* 55)

# New Ideas for Our Model Builders

## Steam Propelled Airplane Models

AIRPLANE modellists of today pin their faith to three sources of power, rubber motors, compressed-air motors or carbon dioxide motors—very rarely the latter. Now, before amateur model building gained its present popularity, or in fact before any full sized airplanes were flying at all, there were a number of steam propelled models that had made excellent flights.

First, came the Ader steam model, the first airplane of any sort or size to make a flight. Then came the steam powered models of Langley and Hargraves, which performed notable flights. The Langley model, a beautifully constructed tandem monoplane, flew for more than a quarter mile before its steam was exhausted.




A typical steam power plant for model airplane.

In view of these early triumphs, it would be interesting to experiment with steam power once more, and find out whether the performance of the old experimental models could be equalled or improved. It would also be interesting to turn from experiments with the models themselves to experiments on the motive power.

Now, the first thing to consider is the fact that a steam engine operates on practically the same principle as a compressed air motor. In many cases, an ordinary compressed air motor such as those now found on the market, can be used. Our main problem, therefore, is the production of a suitable boiler and burner for producing the steam, and a suggestion is shown by the accompanying sketch.

Here we see that the steam engine is located at the left, which may be a two-cylinder compressed-air engine, as shown, or an air engine with any number of cylinders. Connected with the engine, at the point where the compressed air is ordinarily connected, is the "flash-type" steam boiler consisting of a number of turns of ⅛-inch steel or copper tubing.

Inside the tubular coil of the boiler will be seen the flame projected from the nozzle of the burner. Gasoline or naphtha is used as fuel, placed under air pressure in the fuel tank, and is vaporized in the three turns of tubing at the right of the boiler coil. The vaporizer coil must be close enough to the boiler to become strongly heated, for liquid gasoline will not burn properly.

A feed-water pump, driven through reduction gearing by a long shaft extending back from the engine, draws water from the water tank and sprays it into the hot boiler tubes. It immediately flashes into steam (hence "flash boiler"), and the steam then passes to the engine where its pressure creates the power. The feed-water pump is the main difficulty in this construction, for it must supply the water in the exact quantity required by the engine.

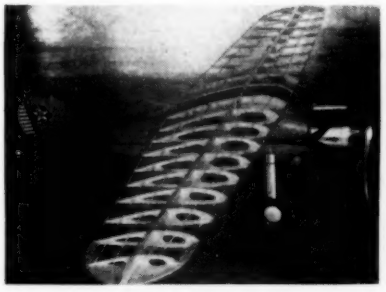
## An Interesting Scale Model

IN the accompanying photograph is a very well designed and constructed scale model of the Lockheed "Vega," built by R. A. Pouch, New Brighton, N. Y. It has a wing span of six feet and is driven by a six cylinder, 1/6 horsepower compressed air motor.

This flying model will take off from the ground and fly about 2,000 feet under its own power.

The fuselage is in two halves, glued together, carved out of solid balsa wood. This has proved very light and strong. The landing gear is of aluminum tubing bolted to the N. A. C. A. cowling.

An 18-inch propeller is direct driven by the air motor, and the motor is controlled by a valve just in back of the cowling. The total weight is 36 ounces, with a loading of six ounces per square foot of wing surface.



Compressed air driven scale model of Lockheed "Vega."

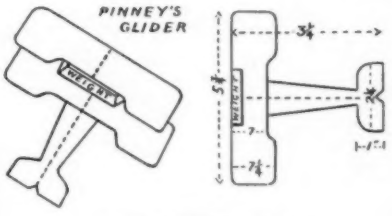
## Flying Paper Models

A GREAT deal of sport and information can be had from simple paper models, cut from rather stiff paper similar to the paper used for the covers of POPULAR AVIATION. Monoplanes or biplanes can be constructed in a few moments that will display a remarkably fine gliding angle. And now for some hints.

It is important that the model be perfectly symmetrical; that is, all parts of the wing on the right side should be identical with those on the left. This result can be attained by first folding the sheet of paper and then cutting out half the outline about the fold. When unfolded, the model will be perfectly symmetrical.

Gravity is, of course, the propelling power or "engine" for these gliders, and as the paper is far too light, an additional weight must be added to the nose so that the glider will move forward. Preferably, this should be a wire paper clip, for a clip will grip the paper tightly, and at the same time it is an easy matter to slide it back and forth until the proper balance is obtained.

Everything depends upon the balancing of the model. The paper clip is moved back and forth in the center and front of the wing until the best gliding angle is obtained. Moving the weight forward tends to make the model dive, while moving it backwards tends to produce a "stall" with the nose pointing up. Between these two extremes will be found the proper location of the weight.




A paper biplane model.

As a general rule, narrow tapered wings give better results than short stubby wings. The narrow wings are more stable and give a better gliding angle. Sweeping the wings slightly forward, with the tips slightly ahead of the center of the wing, generally gives a more stable model than straight wings. Tapering the wings toward the tips gives better performance than a wing of uniform width.

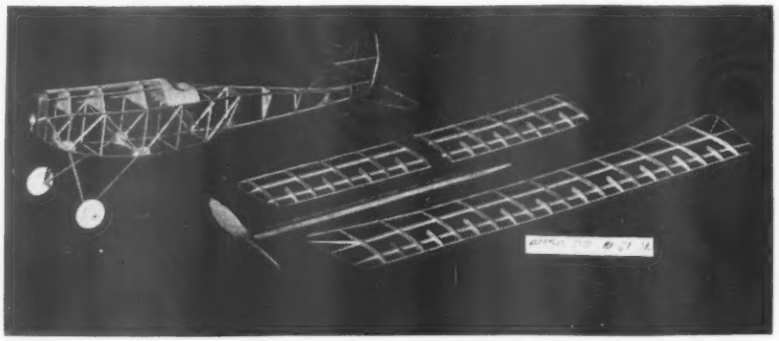
Now, while these models are primarily intended for indoor flying, they will also fly well outdoors on a fairly still day. If launched from an upper story of a building, very remarkable results can sometimes be obtained because of the ascending currents of air.

# MODEL DEPARTMENT

## HOW to Build the Ansaldo

by

JOSEPH S. OTT



Showing wing and fuselage structure.

DURING the World War, the Royal Italian Air Force developed planes that were used for fighting against the Central Powers. Because of the high altitude flight required, the wing area had to be very large so that the loading per square foot was reduced. The Ansaldo is a ship of this type.

The Ansaldo model, reproduced on these pages, carries an additional weight above its own weight of 1½ ounces. The scale and the position of the wings shown here is exact, according to the large machine. The completed model weighs approximately 2¼ ounces. With the additional weight of 1½ ounces, the total is brought up to 3¾ ounces. This weight, added at the nose, will cause the wings to remain in their true scale position.

To compensate for the total load, the angle of incidence on both wings should be approximately 3/16". Less than this, will cause the model to fly very fast, which is not a desirable feature.

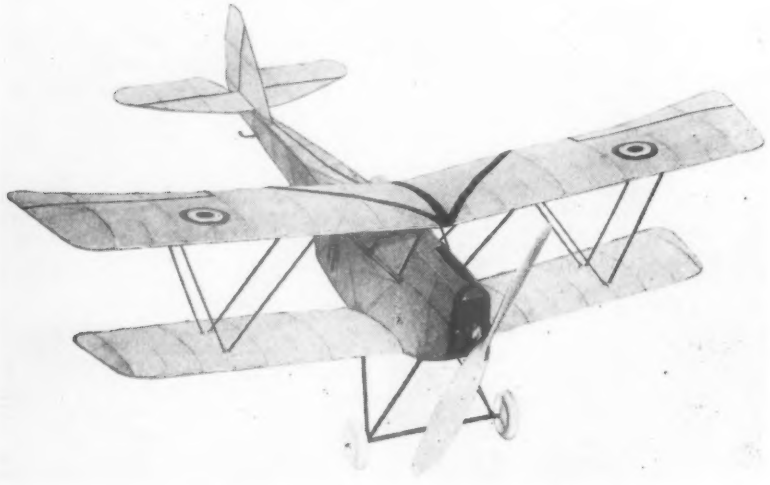
Part of the body is shown broken apart, and the length cut away is approximately 1" for the 15" model and 2" for the 30" model. The proportions of this scale may be maintained when building smaller or larger models. However, this is allowed only when making a true scale in body length.

It may be laid out as a full size drawing, keeping the dimensions as given, and eliminating the cut out section. Note that the body to the rear of the cockpit on the lower side forms a "V". While under construction this will make the body appear fragile and tend to twist easily. However, after being covered, it becomes fairly rigid.

The trailing edge on both wings should be made of fairly hard balsa so that warping will be reduced to a minimum.

*ABBREVIATED BUILDING INSTRUCTIONS*

1. Body.
2. Landing Gear.
3. Rudder and Stabilizer.
4. Ribs.
5. Top Wing.
6. Lower Wing.
7. Propeller.
8. Motor Stick.
9. Covering (Body, Tail and Wings).
10. Shrinking (Covering).
11. Decorating.
12. Balancing.
13. Flying.



The Ansaldo model completed and ready to fly—a beauty.

*Body—No. 1*

Lay out a full size view. Then build the balsa pieces, longitudinal parts and the uprights on the flat sides. After completing two sides, assemble the top and the lower cross members.

*Landing Gear—No. 2*

The entire landing gear is built up of thin bamboo, 1/32" by 3/16". Where the bamboo is attached to the body, allow sufficient material to bend over and cement against the lower sides of a cross member. A 2-inch diameter wheel is required for the 30-inch model. The entire landing gear is cemented and tied together with thin silk thread.

*Rudder and Stabilizer—No. 3*

For models under 24 inches, the tail group may be built and covered only on one side. When a larger size model is desired, it is best to use a wing section of a good streamline form, with covering on both sides.

*Ribs—No. 4*

Two sizes of ribs are necessary. One for the top and one for the lower wing. The ribs of the top wing are slightly larger, and care should be taken so that duplicates are not made. At the place where the strut holds the wing to the body, it is advisable to make additional small squares of balsa. These parts should be flush with the covering on the wing. The struts may be attached to the wing when assembled to the body.

*Top Wing—No. 5*

The top wing is built completely and then cut in the center. The dihedral is then put into the wings cementing the center firmly together.

*Lower Wings—No. 6*

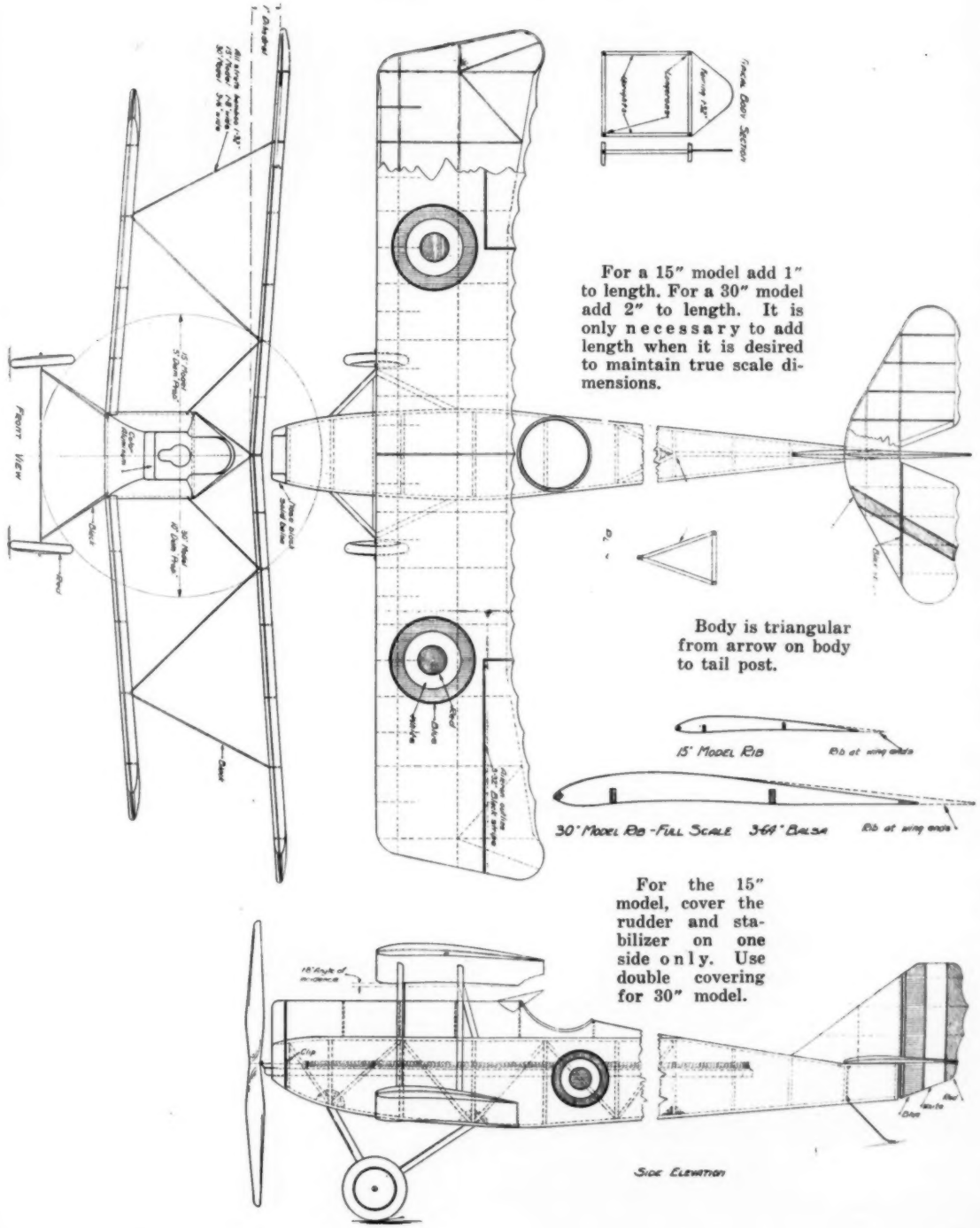
The lower wing is a trifle shorter than the top wing. The lower wings are cemented to the body in their proper positions and the top wing is then cemented to the "V" struts on the body at the center. This type of model has no flying nor landing wires. The struts take all the strain.

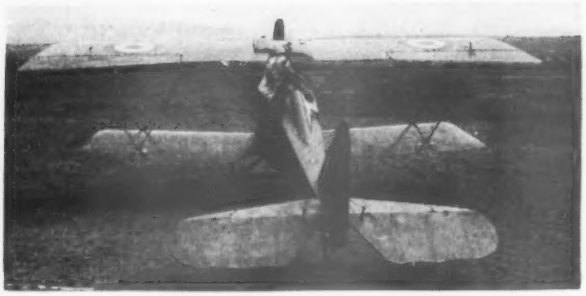
The front view clearly illustrates the required angles of the struts. The size is 1/32" by 3/16", all made of bamboo.

(*Continued on page* 46)

# The Ansaldo Biplane

## *A Flying Scale Model*


FRONT VIEW
Body
Rud.
Elev.
Wire
Rud.
Elev.
Body
Tail Post
Rud.
Elev.
Body
Tail Post
Rud.
Elev.
Body
Tail Post



The later type of Ansaldo biplane from which the model is a scale replica. Note the distinctive body design.

Do not forget that the wings should be covered before their final assembly to the body.

At the points where the struts enter the wing, an additional small block of balsa should be added to which the struts are cemented.

*Propeller—No. 7*

The landing gear is built to take a 10-inch propeller. If an 11-inch or 12-inch is desired, it is necessary to have the landing gear a little bit higher to compensate for the added length.

*Motor Stick—No. 8*

The motor stick may be made of hard balsa or pine, depending upon the material at hand. The size of this part is approximately ⅛" by ¼" for pine and 3/16" by 5/16" for balsa.

*Shrinking—No. 10*

After the complete model has been covered, spray water on covering very lightly—then allow to dry.

*Decorating—No. 11*

The decorations (Insignia) are added to make the model represent a wartime plane.

*Balancing—No. 12*

The wings of this model are set far forward and it will have a tendency toward being tail heavy. To offset the weight of a long tail unit, approximately an ounce and one-half should be added to the nose of the model. This might seem like a good deal, but the 30-inch model, for which this amount is correct, will easily carry the load.

*Flying—No. 13*

When testing the model for flying, it should glide equally as well with or without the motor stick in position.

Because of the possibility of damage to a scale model, it is advisable to employ dihedral. Inherent stability is desired of all models, because they do not have the ability to correct their path of flight.

The utmost caution must be exercised when trying out a model for the first time. The approximate center of gravity must be located.

Then, the necessary weight is added to the nose in order to bring about the meeting point of the center of gravity and the center of pressure.

After this is secured, it may be advisable to glide the model without the motor stick. Then add the motor stick, and glide again, and making adjustments for the flight. When the model is ready to be tried, it is advisable to have a boy friend help in adjusting the proper balance. One boy launches it, and the other boy catches it—first being very close together and gradually widening the distance until the model glides normally.

The wartime Ansaldo biplane has many interesting features that made it a rather advanced design during the latter part of the war. All models of this ship used water-cooled engines, and all of them had the typical high narrow radiator that was distinctive of this builder.

The earlier models of the Ansaldo, however, were provided with the standard form of interplane bracing having struts and diagonal stay-wires, while the later models had a "Warren" type or "Zig-Zag" bracing built up of diagonal struts.

This Warren bracing was easier to assemble and take-down than the stay-wire type, and this was a matter of great importance where a plane was to be taken down quickly for shipment. As each strut maintained its exact length under all conditions, no adjustment was necessary when the wings were assembled.

The triangular fuselage section was another typical Ansaldo arrangement. It was much lighter than a square section, and again, the triangular section needed no "torque" bracing. The forward part at the pilot's station was square, but the body broke out into triangular section just to the head of the cockpit.

The earlier Ansaldo biplane using the conventional type of interplane bracing. Note the tall narrow radiator.

## Notes to Amateur Builders

AIRPLANES that fly over oceans and the Poles are getting to be a bit commonplace, but when one is built to make its maiden voyage through the rear wall of a home—that's news!

And that's how the home-made plane of John Deitrich, 23-year-old Buffalo, N. Y., youth, will be launched in the spring.

Several months ago John decided to build a plane for himself and he chose the cellar of his home as the workshop. After many nights of diligent labor, the fuselage of the machine was assembled—and was still in the cellar. Now all that remains, to get the ship into the air, is to knock out an entire rear wall of the building.

John surveyed his handiwork rather ruefully. Eyeing the rear wall, he shook his head.

"That wall's going to take a lot of smashing before we get this baby into the air."

"As a matter of fact," John continued, "when I started to tinkering with this plane, I had no idea of making a regular flying ship. I was only trying out my mechanical skill. Things went along, though, in such good order, that I changed my mind. For a while I forgot that I'd have to get the plane into the open, and didn't measure the doors."

## Baron Lands on Rhino—Not Rhine

BARON PAUL C. VON GONTARD, of Germany, set out to see Africa by airplane, but because a cantankerous rhinoceros objected, he had to cut his tour short.

The flying trip was going splendidly, the baron reported, when one day the motor began to sputter while the baron was over a jungle. But he limped on until he cleared the heavy growth, and came to a landing on the veldt near what he thought was a large ant hill. The plane coasted up to this ant hill and one wing gently nosed it as the plane came to a stop.

Imagine the baron's embarrassment when that ant hill heaved up on four legs, roared,—or whatever rhinos do when rudely interrupted in the midst of a sun bath—and came for that plane, horn lowered!

Use this handy coupon for

FREE ANSALDO PLANS

Send 5c in stamps to cover mailing cost to

**Model Plan Dept., Popular Aviation, 608 So. Dearborn St., Chicago, Ill.**

**THIS FREE OFFER EXPIRES JAN. 10**

Name.....

Address.....

City..... State.....

**NOTE:—Please confine your letters to requests for plans only.**

# We couldn't improve on the quality, so we lowered our prices—*and How!*

With the doubling of our plant space, larger volume in purchases of raw materials, and standardization of parts (supplying instead of redicut ribs, material with which to make them), great savings have now been effected in the production of Cleveland-Designed Model Kits. Because these Kits have always been designed from a quality standpoint—"the best that could be made"—there was no opportunity of passing these savings to our many loyal friends, and friends-to-be in the way of better quality: so we have made radical price reductions on most of our models. Thus, every model enthusiast can today easily satisfy his cherished desire of building authentic Cleveland-Designed models. They are now within the reach of everyone—and the quality remains today as always, "the best that can be made". Each Kit is complete—with large, full size super-detailed drawings to cut up for patterns, easy to follow instructions, photographs, and best quality material and accessories to build the complete model. Send money order, or check (No C. O. D.'s) for the Kits you want at these new low prices—add 15 cents each for special delivery—we will rush them to you immediately.

## Polish P. 6. Fighter

Reputed to be one of the world's most efficient military aircraft, this airplane with its graceful gull wing and beautiful lines deserves authentic reproduction. Model will tear along at a high speed covering great distances, often over 500 ft. ¾-inch scale. Span 25⅛ inch, length 17⅛ inches, weight 2.3 oz. Colored entirely yellow, details black, red and white Polish insignia. Complete Kit SF-6, only $2.95 postfree. (Special Delivery 15c extra).

## Laird Super-Solution

Major Jimmy Doolittle's 11-hour-and-15-minute Coast to Coast record breaker. Model is ¾-inch scale. Flies over 500 ft., about 35 m.p.h. Span 15⅛ inches, length 13¼ inches, weight 1.7 oz. Colored yellow and green. Complete Kit SF-5, only $2.50 postfree. (Special Delivery, 15c extra).

***Every Picture on this Page*** is an actual photograph of the Cleveland-Designed model itself (not the big ship it represents), superimposed on realistic backgrounds, in some instances.

## Curtiss JN-4 Training Plane

The ship in which many of our war pilots learned to fly. Model is ¾ inch scale. Span 32⅝ inches, length 20⅜ inches, weight 2.7 oz. Colored all yellow with black equipment and trimmings. Complete Kit SF-4, only $2.95 postfree. (Special Delivery, 15c extra).

## De Haviland-4 Battle Plane

Nicknamed the "Flaming Coffin". Model is ½" scale—span 31-⅜", length 22 ½", weight 3.9 oz. Colored all yellow and black. Complete Kit SF-3, only—$3.50 postfree.—(Special Delivery, 15 cents extra. Study the details—bombs, guns, radiators, etc. All Cleveland-Designed drawings show everything full size with every detail that may be practically modeled. Every one will fly successfully at scale speeds when built from our complete kits.

## Curtiss Helldiver

This model of the famous power-diver is ¾" scale, and span of 23-¾", length 16½", weight 2.7 oz. Colored (representing silver) natural wings, and horizontal tail; blue fuselage, struts, fin, rudder and wheel shoes; black details. Complete KitSF-7, only $3.50 postfree. (Special Delivery, 15 cents extra.)

## Sopwith Camel

One of the famed English RAF wartime ships. ½" scale. Span 20-⅜", length 14-½", weight 1.8 oz. Colored orange wings, green stabilizer and part fuselage; most of fuselage orange; green struts, black details. Complete Kit SF-10, only $2.50 postfree. (Special Delivery, 15 cents extra.)

## New Boeing Fighter

Now widely used in U. S. Air Services, and is sometimes called Boeing's Helldiver. ½" model has span of 22-¾", length 14¼", weight 2.0 oz. Colored yellow, green and black. Complete Kit SF-8, only $2.95 postfree. (Special Delivery 15 cents extra.)

## SF-5 (Sopwith Experimental-5)

Another famed English RAF wartime ship. ½" scale. Span 20" length 15⅛", weight 1.9 oz. Colored ivory and black. Complete Kit SF-9, only $2.25 postfree. (Special Delivery, 15 cents extra.)

**Send 5c** at once for big illustrated folder, crammed full of large pictures of Cleveland-Designed models—36 of 'em! All the high quality supplies we stock are listed, too. If you want a copy of our No. 8 catalog when it comes off the press (about February or March) your copy will be rushed to you. As soon as the catalog is ready —sent 25c now for your reservation. (Old customers, please have patience—for the Jumbo folder we sent you replaces it temporarily).

**CLEVELAND MODEL & SUPPLY CO.**
1866PA West 57th St., Cleveland, Ohio

**Join the N. A. M. E.** (Incorporated)

*The* **NATIONAL ADVANCED MODEL ENGINEERS**

is a national organization catering to the advanced model builder (including beginners), for building the scientific scale models of today. Our National President is the well known Major "Jimmy" Doolittle. Vice Presidents include such men as Col. W. A. Bishop, Capt. H. C. Richardson, Col. Wm. Thaw, Capt. H. L. Price, Editor Model Airplane News and others. National Director, D. F. Chase. Send 5c (to cover mailing costs) and application blank for temporary membership card, pin and complete information.

**Fill out and mail NOW!**

Membership Application Blank

**NATIONAL ADVANCED MODEL ENGINEERS**

**1866PA West 57th Street** **Cleveland, Ohio**

The undersigned wishes to become a member of the National Advanced Model Engineers (N.A.M.E.) to practice and learn the building of model aircraft—duplicates of full size airplanes—and to earn his full title M.A.E. (Model Aeronautical Engineer).

*Print Name*.....

*Address*.....

*City*..... *State*.....

Model Experience.....years. Age.....years.

# WOMEN'S ACTIVITIES
## *Edited by* Lady Mary Heath

Miss Ruth Nichols has set another record by flying from Oakland, California, to Louisville, Ky., non-stop. Her distance was credited with 1,977 miles which increases the non-stop flying record for women by over 100 miles.

* * *

Lady Mary Heath.

Mrs. Mae Haizlip, who was one of the leading prize-winners in the 1931 National Air Races, also put up a new women's altitude record in a Buhl Pup last month.

* * *

Miss Bobby Trout, who holds the women's endurance record for sustained flight, with Mrs. Edna May Cooper, is having a special plane constructed. She hopes to fly to the Hawaiian Islands from California in February.

* * *

Mrs. Freddy Lund, who was taught to fly by her husband, had the misfortune to see him meet with a fatal accident at Lexington, Ky. She very gallantly gave a fine stunt flying exhibition of the Jersey City Airport on three consecutive days, three weeks later.

* * *

Miss Margery Durant, who recently toured Europe so successfully, has planned a flight to South Africa. She is taking a twin engined Sikorsky. She did very useful work for the National Aeronautic Association while last in Europe.

* * *

Mrs. Edna May Cooper has planned to leave California almost immediately to tour Europe. She has had invitations from four European Courts to visit them. She is also to obtain a Medal from the King of Rumania for her endurance flight last year.

* * *

Miss Peggy Salaman has just lowered the time to Capetown, South Africa by one day. She took five and a half days to complete it. Her machine was a Puss Moth, and her co-pilot was Mr. Gordon Stone, who assisted her considerably in night flying. Miss Salaman is just 19.

* * *

Patrolman Otto Kafka, who used to be the laughing stock of the police force, is now their hero. Last year he saved a girl from drowning. On October 31, he received the first Citation of Departmental Commendation, the first flying policeman to get it.

* * *

Mrs. Amelia Earhart Putnam has been named member of the National Aeronautic Association for the National Air Pilots Association. In addition, she has been elected President of the "99" Club, which is getting out a monthly letter to be circulated to all its members.

* * *

At the Air Fiesta, held in Los Angeles, Mrs. Gladys O'Donnell won the 1,000 cubic inch race from five men pilots at 169 miles per hour. She also won the women's free-for-all.

* * *

On Saturday, October 24, a banquet was held by the Evening Graphic at Gimbels, New York, for their boy and girl members. Over 3,000 children present. A contest was held the preceding week for the girl members, which was won by a girl from Elmira. A number of women pilots were present and addressed the gathering. Among those there were Miss Elinor Smith, Miss Foulkes and Lady Heath.

* * *

Mr. and Mrs. Healy Day, who are flying round the world in a homemade machine, have now reached Amoy from Hong-Kong.

* * *

A dinner was held at the Forum Club, London, on October 13, to greet the new chairwoman of the Ladies Aviation Section. Mrs. Chalmers was in the Chair.

* * *

Mrs. Maurice Hewlett, who is the only woman in the world to have taught her son to fly, has just flown to Batavia by the K. L. M. She is therefore the first person of either sex to make this trip by air.

* * *

At the Cardiff Air Show, a race round Newport was won by Miss Winifred Brown in the airplane with which she won the King's Cup last year.

* * *

During the recent election in Great Britain, not only did Miss Ishbel McDonald fly on behalf of her father, but Miss Fidelia Crossley and Miss Winifred Spooner also took part in a special flying squad for election purposes.

* * *

In Great Britain, 113 women pilots have been licensed. Of this number, 108 hold private licenses and five have the "B" or transport licenses. In the United States there are 480 women pilots of which 38 are transport pilots.

* * *

The thrill of seeing the airship Graf Zeppelin caused Mrs. Mabel Cooke to recover the use of her speech.

* * *

An aerial honeymoon is to follow the marriage of Miss Sheffield Moriarty with Mr. Crocker Snow of Boston, They are both enthusiastic pilots.

* * *

Mrs. Keith Miller has completed her plans for regaining her lost west to east flight record. Her machine has already been built.

Mrs. Bowman has the distinction of being first in the Dixie air derby last year, and was second in the Los Angeles to Cleveland air derby of recent date. She flies all types of planes, including a tri-motor. This is attempted by comparatively few women pilots.

* * *

Miss Eva "Johnny" Johnson, of Ohau, New Zealand, and who is working as a nurse for a doctor in San Francisco, has obtained her private pilot's license.

* * *

Miss Erna Bach, the 16-year-old licensed pilot, flew from Monterey to San Francisco.

* * *

At Tollerton Aerodrome, England, in honor of their silver wedding, the Rev. John Pyddoke, rector of Pleasley, and his wife, set up a new aviation record by qualifying for their pilot's licenses on the same day. He is 61 and she is 52.

* * *

At Baltimore, Miss Helen Richey, McKeesport pilot, took first honors in the aerial acrobatics contest for women.

* * *

Miss Clara Livingston is the first woman to fly the Caribbean sea. She left Roosevelt field and was forced down on an uncompleted field on her own plantation, a few miles from San Juan. She remained there till the storm was over and then proceeded to San Juan.

---

## Autogiro

(*Continued from page* 20)

minded one of the 3000 foot runway strip at the Wayne County Airport near Detroit.

Now we're back over the city again with the motor throttled way back and just sitting still. Not moving in any direction except down—very slowly. It's time for another glance back at Captain Julian and one at the rotating blades. Both are reassuring.

Up and down we go, riding the convection currents from the miniature canyons of Boston's downtown district. What a thrill! No head winds to stall us and no feeling of being about ready to fall off into a spin. We were stopped!

But now we have our own thrill in store for us. The landing in an Autogiro. Julian shot the field once, to give us a good glimpse of the airport and the new construction work. Then with the engine throttled back we started on a slow and strange descent. Very little forward speed, and unlike the sensation of the Chrysler Building elevator.

Down, down, down. Between the administration building and the Number 2 hangar. No buildings flash by, but down we come. Get ready for the hard landing.

And, just as a feather hits the ground when dropped—so did the Autogiro come to rest on its vertical landing. Landing speed, zero.

## Glider Crashes

(*Continued from page* 43)

glider to 15 feet. The left wing dropped and the nose turned right. Then the craft drove at the ground almost vertically and nosed over. The pilot hung from the fine, wide Rusco safety belt with his arms and legs dangling in the air. A smashed wing-tip, crushed cabane strut, bent nose and crumpled rudder was the extent of the damage.

Pancakes, dives into the ground and two-point landings have all brought a good deal of wear and tear, not only on the good old ship, but also on everyone's nerves. At one time I used to think fatalistically that a certain number of crack-ups were to be expected for a given total of flights. Now I know better.

There really is never any need for a ship's being damaged during the auto-towing instruction, even with a large and varied number of individuals, provided certain precautions are observed and the instruction system is thoroughly understood.

We would never think now, of towing a beginner with the stick untied. Nor would we let some one practice banks and turns who hadn't repeatedly demonstrated his ability to make straight flights, nosing over properly before releasing and gliding in safely and with an indication that he knew the difference between ground and air speed.

We recently held a successful two-day air meet in conjunction with one of the local airports. We split 50-50 on the gate, did our share of the work, and put on half of the show. One event was a demonstration of our system of instruction in which most of the club members took part. Members in various stages of progress, from the novice to the finished glider pilot, illustrated the method used.

First, a beginner balanced the ship in the wind. Then another was towed along the ground with the stick tied well forward.

Third, came the pilot's first take-off. With the stick still tied just forward of neutral another member was lifted a few feet off the ground. Then the car slowed up and the ship glided back to earth. A number of such tows, it was stated, were given to the rapidly-progressing pilot to teach him the necessary air speed needed and get him accustomed to being off the ground.

Four was the pilot's first free-stick flight. Instructions required the pilot to start off with the stick well forward, gradually redressing until the ship took off; then the stick was to be moved slightly forward again. By regulating the speed of the car, the glider was towed off to a few feet or made to come down. The release cord was removed to prevent an accidental cutting-loose of the tow-rope.

Next followed some real flights to altitudes of from 5 to 50 feet. After that came slight left or right turns, the ship being towed off a little cross-wind

(*Continued on page* 53)

## Archie Dodging

(*Continued from page* 10)

By this time all seventeen engines were warming up—their exhaust pipes spitting flames which glowed vivid in the half dawn. Campbell winced as he looked at this spectacular array of ruthless death-carrying devices. As he approached 7904, a mechanic climbed out to make way for him. Smith was already in the rear cockpit and reached for Campbell's haversack and cap.

Climbing in, Campbell noticed a signal card under the windshield. On it were the following signs: letter "J"; letter "C"; a picture of a bomb; the red, white and blue markings of British planes; the blue, white and red tricolor of the French; the black, yellow and red of the Belgians; and lastly, the black iron cross of the Germans. Smith leaned over and shouted in his ear:

"If my gun jams, I'll point to the 'J'. When I clear it, I'll point to the 'C'. I can get a good sight on the target, so when we are over it I'll point to the bomb and you pull 'em off with this." He pointed to the lever on the right of the cockpit. "I'll identify any planes I see by pointing to their respective markings, but if it's a Hun, I'll back it up with a slap on your head."

CAMPBELL fastened his safety belt and adjusted his incidence wheel for taking off. He glanced at the engine water thermometer. It registered forty-five degrees; soon it would show sixty, and that meant "Go."

He removed the lock from his stationary Vickers machine gun in order to test his synchronizing gear—that marvelous piece of mechanism which enabled him to fire six hundred rounds a minute between the blades of his propeller, without shooting them off. It clicked and was in order. Smith was testing his Lewis gun. Campbell pushed the toes of his boots through the strap loops on his rudder bar. They would permit him to operate the rudder with one leg if his other was put out of commission.

The temperature of the water was sixty degrees now, and he motioned to the mechanic holding his right wing to get to the fuselage by the tail plane. He opened the throttle. Eight hundred — nine hundred — eleven hundred — twelve hundred—thirteen fifty—fourteen fifty—fifteen hundred revolutions a minute showed on the tachometer. He closed the throttle—now he was ready. In his mind he prayed that in the few hours ahead he might acquit himself as a man.

On up ahead, a machine with blue, yellow and red streamers moved out of line. A mechanic at each wing tip steadied it as it taxied across the 'drome. They were all moving now. Campbell waved for the chocks to be pulled from his wheels and he started for his formation position.

Campbell nodded. He adjusted his goggles and pulled on his first pair of gloves. The formation was lined now and Flight Commander Sampson, waving his hand—took off. First right started and then first left. Soon it was Campbell's turn and his hand eased open the throttle. Slight forward pressure on the joy stick raised the tail.

God! how she swayed! Would she ever get off? He had never flown with a load like this. Where was that sunken road? Now she was leaving. He must keep to the left to avoid the slipstream of the man ahead of him. Campbell switched from his gravity tank to the pressure feed gas tank.

Well, they were all closing into pretty good formation. Sampson was heading them out to sea—straight toward England. There were the cliffs of Dover. Fourteen hundred twenty-five revs. on the tachometer. Engine running well. Water sixty degrees—air speed seventy miles an hour—altitude two thousand feet. Campbell gave his incidence wheel a half turn back to permit him to climb more easily. He put on another pair of gloves, holding the joy stick between his knees.

The man ahead of him, and slightly below, was keeping excellent position. Campbell was fairly lined up with Jarvis—last on the right. Sampson was setting a pretty fast gait. There was a boat down there in the Channel; it looked like a cigar. That dull ache in the stomach was gone now—everything would be all right if the engine performed.

He glanced again at his instruments. Five thousand feet now—getting a little chilly. On went another pair of gloves. He looked behind him. Smith was sitting down—his Lewis gun cocked in the air. Did he hear a funny noise in the engine? Water temperature was dropping a little. He gave the wheel a couple of turns that hoisted the radiator under the cowling—that would warm it.

Couldn't see England now. Third right was not so good at formation. It looked as if he had the whole right side worried. Well, he would probably steady when they got to the lines. Campbell searched the instruments again. Everything seemed to be in order. He let his radiator down a little. Time he tested his gun. Smith had let go a few bursts a short time back.

He eased on his joy stick to pick up the nose of his machine, so as to be sure that his shots would clear the man ahead. He pressed the little lever which was clamped on the joy stick by a metal band. *Rat-tat-tat-tat, rat-tat-tat-tat.* Every fifth a tracer bullet, looking like a flashlight bulb, leaving the muzzle of the gun. Altitude twelve thousand feet now. Sampson was crossing the coast again.

SO THAT black handle in the ratchet disc was the trick that released the cargo! He hoped Smith would take a good sight—terrible to go all through this and not do any damage. He scanned the instruments again. Had

(*Continued on page* 52)

## Zeppelin

(*Continued from page* 22)

and dock at Akron, Ohio. This latter building, while not essentially different from the first wooden shed, is a huge steel room 1,175 feet long, 325 feet wide and 211 feet high. It covers 8½ acres of floor space and cost more than six times as much as Zeppelin's first airship building fund. A Zeppelin of 10,000,000 cubic feet gas capacity can be assembled in the Akron building.

With characteristic reticence, Count Zeppelin refused to discuss details of his airship until it was nearly completed. There were, of course, all kinds of speculations respecting its nature.

For several days before the scheduled flight of the LZ-1 on July 2, 1900, "experts" delivered lectures, debated, circulated printed matter, buttonholed passersby in order to force upon them more evidence and otherwise attempted to prove that the airship would be a total failure.

"It will bend under the weight of its two gondolas and the controls will not work," they exclaimed. "Perhaps it will break in two in the middle. And besides, the power plants and crew will weigh so much that the ship will be unable to leave the lake surface. But if it should, the motors will ignite the hydrogen gas and the thing will explode."

Many were the exclamations when the long cylinder was hauled out of its shed. These became gasps of surprise when, without unnecessary ceremony, the craft lifted itself into the air. Its propellers whirred and it sailed gracefully over the lake that its builder had known from boyhood. A speed of 17.5 miles per hour was attained.

Further proof of the airship's success was provided a few minutes later when Count Zeppelin made a perfect landing, even though a sliding weight used to balance the ship had become jammed.

The LZ-1 made several other successful flights, and people who had declared the Count a dreamer—too old to be fooling his time and money away with worthless airships—began to regard him with some measure of respect. But the meager capital, with which Zeppelin started, was now gone and lack of funds made it necessary for him reluctantly to dismantle his airship.

THEN, for five long and weary years, Count Ferdinand von Zeppelin tramped up and down Germany, talking, lecturing, showing plans and pleading with influential and wealthy men—trying to raise another fund for the construction of a second and better airship. But the world, or at least Germany, was not ready for airliners. Everyone turned a deaf ear to the inventor's pleas.

Then Luck smiled for a short time. For some obscure reason, King Wilhelm of Wurttemberg, finally supplied the necessary money, and an aluminum manufacturer agreed to furnish metal for the second Zeppelin airship. Count Zeppelin, now 67 years old, set to work with the enthusiasm of a youth of 20. He labored day and night. In the fall, an improved airship with a lighter and stronger framework, and two motors of 85 horsepower each, was ready for its trial flight.

Misfortune again paid a brief call, for, as the LZ-2 was being taken from its hangar, it suffered a damaged forward steering year, got out of control and was finally blown across Lake Constance against the Swiss shore. It was brought back and repaired, however, and a few weeks later was flown successfully.

On one of its later flights, a forced landing was made while motor trouble was investigated. A sudden winter storm overtook the ship and damaged it to such an extent that Count Zeppelin had to dismantle it.

"Now he's through," everyone declared.

But the genial and energetic Count paid no attention to this. He still had some money left. Scraping together every mark he built still another airship—the LZ-3. It was much better than the first two. The government became interested. Officials told Zeppelin that, if he could build an airship capable of staying aloft 24 hours, they would buy it for government use.

Somehow he obtained more money, and a few months later the LZ-4—bigger and still more refined—was launched. Count Zeppelin astounded the world by taking it up over the Swiss Alps to Lucerne and then back home to Friedrichshafen. Later, he flew to Stuttgart and landed.

But an unexpected storm came up. It seemed as if the Count's bad luck always rode on a storm, and the ship was blown against a tree. The highly inflammable hydrogen gas became ignited, and in a few minutes all that remained was a blackened smoking skeleton of aluminum.

HOURS later, the curious crowd watched a grave-faced old man as he carefully poked among the ashes with his cane. It was Count Zeppelin, looking for something that might be of value, and meanwhile trying to think of a way to prevent such mishaps in the future. He presented a pathetic appearance, that of a man becoming old and who had lost everything by a turn of fate. His feelings, probably, were not much different from his appearance to the townsfolk—for he was again "broke."

Somehow, his defeat aroused a feeling of pity which swept throughout Germany. In one of those rare and inexplicable moments when a whole nation responds as a single person, a movement was launched for the raising of another Zeppelin building fund. Within a few weeks 6,000,000 marks (about $1,500,000), were turned over to the inventor.

From that moment he regarded his airships not as his own property, but as something that belonged to Germany—to the world. He organized the present Luftschiffbau Zeppelin and established the Zeppelin Endowment Fund for the Propagation of Air Navigation. The latter controls the activities of the company and its many subsidiaries.

Great shops were established at Friedrichshafen. A separate company for the navigation of airships, known as "DELAG," was formed. At the opening of the World War, the DELAG was operating well-established passenger lines, tickets being sold through Hamburg-American Line offices.

For the first time in his long struggle, Count Zeppelin was firmly established, once the gift of the German people was put to work. He built many ships, all of them successful, and each one better than the rest. During the war, 88 giant Zeppelins were constructed, some of them being turned out at the rate of one ship every six weeks.

It has been said often that the Zeppelin airships figured in Germany's military plans before the outbreak of the war, but such was not the case. When hostilities commenced, there were

(*Continued on page* 54)

SPECIALS

| | |
|---|---|
| 1x32x2x36" Balsa..6 for .25 | ⅛x5".....6 for .05 |
| 1/16x2x36" Balsa..6 for .25 | ½x¾x6".....01 |
| ¼x2x36" Balsa..3 for .25 | 1/16 sq. Rubber 35 foot.10 |
| 1/16sq.x36" Balsa. 8 for .05 | ⅛ flat Rubber 35 foot .10 |
| 3/32sq.x36" Balsa. 8 for .05 | 2 oz. colorless cement...15 |
| ¼sq.x36" Balsa..8 for .05 | Light Mino tissue 3 for .10 |

Add 10c for postage and packing
Send 2c stamp for price list
DALLAIRE MODEL AIRCRAFT CO.
10140 Crocuslawn Ave. Detroit, Michigan

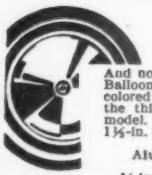
Boeing Biplane
Travelair Plane
Army Falcon
15 in. Size

Build 3 Models for $1.65

Biggest value ever offered: IDEAL 3-in-1 Kit contains everything required to build these 3 Flying Models, including Plans and Instructions. Easy to build.

Postpaid

IDEAL AEROPLANE & SUPPLY CO., Inc.
22-26 West 19th St. N. Y. City.



NEW WHEELS

And now Selley offers a new line of Full Balloon Rubber tired wheels, with bright colored Celluloid discs, brass bushing. Just the thing for your new scale or flying model. Assorted colors.
1¼-in. dia. 25c Pr. 1¾-in. dia. 30c Pr.
2-in. dia. 40c Pr.
Aluminum Disc Rubber Tired Tail Wheels
¾-in. dia. 10c ea.—1¼-in. dia. 10c ea.
Aluminum Disc Rubber Tired Air Wheels
1-in. dia. Doughnut type, 25c pr. 1½-in. dia. 30c pr.
Goodrich Tread Balloon Tired Alum. Disc. Wheels
1¼-in. dia. 50c—2-in. dia. 60c
Full Balloon Rubber Tired Alum. Disc Wheels
1¼-in. dia. 25c pr.—1⅝-in. dia. 30c pr.—2-in. dia. 40c pr.
Celluloid Untired Wheels
¾-in. dia. 10c pr.—1-in. dia. 12c pr.—1¾-in. dia. 15c pr.
1¾-in. dia. 20c pr.—3-in. dia. 50c pr.
Postage on Rub. Tired Whls. 4c pr.—Untired 3c pr.
Send 10c for Illust. Cat. or Models and Supplies
SELLEY MFG., Inc. 1377-P Gates Ave. Brooklyn, N. Y.

LOOK AT THIS ONE—

30" Wingspread Stinson Monoplane Semi-constructed, such as ribs, bulkheads, cowling propeller, and wing tips finished for you. Has movable rudder, and lots of other extras. A guaranteed flyer, makes an ideal Xmas gift.
Complete Kit, Only $1.50 Postpaid
Send 5c for lower prices on supplies and other models.
RELIABLE
Model Aeroplanes
133 Orchard Lake Ave. Pontiac, Mich.

# BOYS - - for only $1.00

*These planes are made by the designer of the famous Silver Ace Aeroplanes.*

## get this new 1932 Model ACE of ACES

Get this *new, fast,* low wing racing monoplane! The Ace of Aces embodies all the aerodynamic characteristics of a large, full powered ship. Takes off with only a "run" of 4 inches. Flies 250 feet or more—and makes a 3-point landing.

Boys here is what you and your friends will want for Christmas. Get this fast and graceful flying, low wing, monoplane (completely molded balsa fuselage. Wing spread 17 inches, over all length 12½ inches, weighs ½ ounce.) Build it yourself. Detailed and complete drawings and assembly instructions with each big kit.

THIS IS WHAT YOU GET

***Fuselage comes completely molded of light, egg shell balsa; all ribs cut to size for tapered wings; stream line molded entering edge; molded and perfectly formed balsa propeller; stream lined aluminum nose piece; light pyralin disc wheels; stream lined landing gear, cut to shape; all wire parts formed; light imperial Japanese paper for covering wings; strong rubber motor and aeroplane cement.***

Only a few hours to build. Full kit for $1.00 plus 15 cents for shipping and postage anywhere in U. S. A.

## GIANT ROCKET GLIDER

*Showing position of Giant Rocket Glider ready for launching*

With wings folded back, you shoot glider straight into the air. At altitude of about 150 feet, wings automatically snap open and glider starts on a long, graceful, soaring flight.

36 Inch Wing Spread

$1.00

Boys who have flown the old fashioned stick glider with frail parts will thrill over this beautifully designed, strongly built new GIANT ROCKET GLIDER, whose wings automatically open high in the air. The Giant Rocket Glider will loop the loop or glide straight away as you wish. Balsa body and wings are specially made for hard service. Wing spread full 36 inches. Comes complete with launching rubber—*ready to fly.*

**Complete, ready to fly, with launching rubber only $1.00 plus 15 cents for postage. Shipped anywhere in U. S. A.**

**ACCURATE MODEL AIRCRAFT CO.**
*DEPT. B1*
**1632-36 No. Halsted St. CHICAGO, ILL.**

*ACCURATE MODEL AIRCRAFT CO.,*
*1632-36 No. Halsted St., Chicago.*

Enclosed cash or money order for ($.....). Please send me..

- ☐ One Ace of Aces Construction Kit.
- ☐ One Giant Rocket Glider—ready to fly.

NAME.....

STREET OR R. F. D.....

CITY.....STATE.....

***BOYS*—YOU CAN WIN many prizes in model aeroplane meets by using Accurate Model Aircraft Planes.**

## Parachuting

(*Continued from page* 30)

remember was his last look at the ground. The 'chute had "cracked" just in time.

An arduous experience of an arduous life was chronicled on August 11, 1930, when Donahue set an official world's high altitude jumping record. Carrying a sealed barograph, he stepped from an altitude later certified by the U. S. Bureau of Standards as 21,171 feet. It was formally proclaimed a terrestial record.

MANY jumpers claim higher altitudes but the unreliability of airplane altimeters was demonstrated in Donahue's jump. When he leaped, the altimeter of his plane showed over 28,000 feet, yet the calibrations on the sealed barograph, when opened at Washington, showed a maximum height of less than 22,000 feet.

This record drop caused extreme discomfort. Donahue was flown to the "ceiling" of a Wasp Ryan monoplane piloted by O. M. "Red" Mosier. Wearing a puffy flying suit, a fur-lined helmet, face mask, a seat pack, a lap pack and bulky oxygen apparatus, Jimmie discovered that he couldn't get out through the cabin door. He sacrificed his oxygen tank and leaped.

The results were almost appalling. He floated down the entire four miles unconscious, with blood streaming from nose, mouth and ears. When his limp body was picked up a half hour later, he appeared to have aged thirty years.

As a profession, parachuting is passing, in Donahue's belief. New government regulations sounded the knell in July, 1931. A new "lid" on aerobatics makes the pilot and the parachute-packer both responsible for the well-being of a jumper.

A 'chute must be of an approved design. For most parachute jumpers, the regulation calls for buying $700 worth of new equipment. And nowadays a jump rarely nets more than $25. But Donahue thinks it is for the good of the game.

## Archie Dodging

(*Continued from page* 49)

he lost fifty revs.? No, he had retarded the throttle a few minutes ago.

Sampson had slowed up. They were closing up now. Down there to the left was a small French town. That was probably La Panne. Yes, on the right were two formations of machines approaching. Smith leaned over and pointed to the British colors on the signal card. That was the escort. Were they going to pass in front? No, they were turning now. *God!* What formation on a short turn.

They looked fine—red noses and red wheels. It looked as if their Flight Commander tried to say, "We're with you," by coming so close. They were gone. Climbing straight into the sun where they couldn't be seen, ready to swoop down if their charges were attacked. Altitude fifteen thousand feet now. There were the floods—that must be Nieuport, and the lines.

Campbell's eyes returned to the instruments, which attracted him as a magnet attracts steel. He knew that if he let the water get too cold, there was a possibility of catching fire.

Three staccato cracks! What was that? Right below the formation were half a dozen balls of black smoke, and now others were breaking on each side. Yes, and about five hundred feet above were dozens of white puffs. So this was Archie gunfire. The machines were spreading out a little.

Some of the boys were banking from side to side and making small "S" curves. Did they think they could dodge it by doing that? There—some more bursts. God! And closer now. One right ahead of the propeller—the smoke of it even hid the engine from view—something would happen now.

Campbell looked over the side—gun flashes—gun flashes everywhere. How would they ever get out of this? There was the Basine du Chasse and the target—but miles and miles ahead still. God, what a gauntlet to run and how the Hell did Smith stand it with no instruments to watch?

SAMPSON had opened up now and was getting into position to straddle the target. The gunfire was intense. A perfect box barrage of high explosive shells hemmed in the formation, while the shrapnel, which was bursting above, was lowering.

Black specks were falling now from the leading machine—then from the others, and Campbell, almost dazed by this inferno, realized that Smith's arm was pointing to the bomb on the signal card. He grabbed the lever and pulled it from notch to notch, and 7904 sailed up relieved of its burden.

Now Sampson was diving—diving to pass under that black wall of the barrage. Campbell kept one eye on the air speedometer — eighty — ninety — a hundred—a hundred and five—a hundred and fifteen miles an hour. Altimeter, fourteen thousand feet—thirteen thousand five hundred—thirteen thousand—and twelve thousand five hundred feet, but the gunners altered their range, lowering the fire.

Sampson turned the formation for the coast. Campbell, on the inside of the turn, retarded his throttle slightly, and pulled back on his stick. If she didn't stall and tail spin he would make it. God, those gun flashes!

The formation was headed for home now. The gunfire was intermittent. Campbell realized suddenly that he was not getting the speed. He opened the throttle, but the response was only fourteen hundred revs.—a valve spring gone. He was falling behind. Suddenly a crack on the head and Smith's finger at the iron cross on the signal card.

Now Smith's gun was firing and red lights going up from the formation. The rear guns of the man ahead opened up but they were almost out of range now. Campbell banked, crossed his controls for a sideslip, then neutralized them and slipped the other way. Looking back, he saw four Fokkers spitting lead. Smith's gun had stopped firing. His finger registered at the "J," with a motion afterward to keep straight ahead.

WHAT was that white Very light from the leader's machine way ahead? It was diving. God, had Sampson been hit? The Deputy Flight Commander was taking his place—now Smith was firing again. Sampson's machine had turned. He was coming back. The others were increasing their lead towards home. Sampson turned on Campbell's tail; Evans, his observer, was blazing away.

Now Sampson was on his starboard side and a little ahead. Smith's gun gone again—Evans was spraying his fire. Campbell got in close to Sampson. Smith opened fire again. Then suddenly Campbell saw two black crosses directly above—he yanked back his stick—the nose of the machine shot up. He grasped his gun trigger and fired.

He was whirling to earth in a tail spin, engine full on and in a two seater

(*Continued on page* 58)

Championship Motor All Assembled ONLY . . . . $3.70
Finished Parts and Instructions ONLY . . . . . $1.95
3-in. D. x 24-in. Tank and Motor Combination SPECIAL . . $9.95
60-inch Wingspread Championship Air Model Kit SPECIAL . . . $4.95

Holds All Records.
Also Uses CO₂ Gas.
THOUSANDS SOLD
For 4 to 8 ft. Models.
RUSH YOUR ORDER

BIGGEST ILLUS. CAT.
Save Money! We Pay Postage! No Extra Fees or Charges! Best Quality—2-Hour Service. ONLY 10c (No free Copies).

HERE ARE SOME REAL BARGAINS!
No. 1 MODEL BUILDERS COMPLETE MATERIAL KIT—Less than wholesale cost! Contains over 100 pieces! Includes over 50 balsa veneers and spars 18 in. long in 15 popular sizes, 30 ft. 3 sizes quality rubber, 5 pairs different sizes balsa wheels, latest dural and steel thrust bearings, assorted washers, 14 in. bamboo, 4 prop. blanks, true pitch balsa propeller, Hoosier Model Glue, special paper cement, 3 kinds model tissue, 5 sizes music wire, 18-in. piece ⅛ in. dia. aluminum tube for entering edges, etc., model blueprint, and many other quality items. More than enough parts for 5 models! Regularly lists over $2.50. Think of it! Special price for complete kit, till February 1st—ONLY 99c POSTPAID.
2 Kits, different plans—$1.89 Postpaid. 3 Kits $2.79.
ORDERS OUTSIDE OF U. S.—Add 10c each kit to price.
No. 2 RUBBER AND LUBRICANT COMBINATION—Best lubricant and livest rubber made. Used by champions and contest winners everywhere! Liberal supply of lubricant and full skein—over 200 ft. of peppiest rubber. Postpaid prices till Feb. 1st only—1/32 in. sq. 49c; 1/20 in. sq. 59c; 3/32 in. or 1/8 in. flat 69c; 3/16 in. flat 99c.
No. 3 AT LAST! ACCURATE MODEL SCALES—WEIGHS TO 1/1000 OZ.—Used by all champions. Build models scientifically with this special scales. Easy to use. Accommodates any model or part. No more guesswork! You can't afford to be without this exact scales at such a low price—ONLY $3.50, Postpaid.

PERU AIRPLANE SHOP
Peru, Indiana
Dealers Write for Terms

## Flying Wing

(*Continued from page* 32)

always tend to head into a side gust, and therefore require additional corrective surface in the rudders and vertical use fins to overcome this directional factor. This difficulty is not insurmountable, by any means, but requires correction to prevent the ship from "yawing" in cross-winds and gusts.

At the wing tips will be seen vertical control surfaces which have been moved forward from their more usual location on the tail. The stationary vertical surface takes the place of the vertical fin, while the hinged portions act as rudders in steering to right or left. They are substantially supported and are not likely to become damaged in hard landings or when running through weeds or brush. So much for the control in yaw and direction.

Now we come to the longitudinal and lateral controls, which are hinged surfaces running along the rear or trailing edge of the wings. These surfaces act as ailerons and elevators at the same time, so that the number of working parts is considerably less than with the standard plane. Both surfaces when moved together point the nose up and down as with an elevator. When the surfaces move in opposite directions, on opposite sides of the necelle, they are "differential" and act like ailerons, correcting lateral displacement. This avoids a lot of complication in the controls, although they are connected up to the usual type of "stick."

With the 30 h.p. engine now installed, the little ship has attained a speed of 90 m.p.h., has glided slowly to a perfect landing with the engine dead and has displayed a remarkable stability in the air. In making landings, the landing gear is provided with a third forward wheel that prevents any tendency toward nosing over, so that a maximum insurance against landing accidents is secured.

Unlike the majority of tailless ships, the wing is not provided with negative or upturned wing tips. The negative incidence angle at the tips has long been a feature with the zanonia type tailless planes, but this application is not made on this ship, and perhaps it is just as well that it is not. Likewise, dihedral has been omitted in the make-up.

Full advantage has been taken of the pusher type principle, and as a result the visibility is excellent from the pilot's location in the nose of the cabin. It would seem at first glance, at least, that the nacelle might have received better streamlining instead of being of uniform width from nose to the motor, but this is a matter that might be controlled by other factors—equally important.

It would be very interesting to see more experimental work carried out along this line, particularly with lightplanes where the tailless idea would probably work out to the best advantage.

## Limping Lena

(*Continued from page* 24)

(2) The owner of the Goosebaum, which was even lousier if possible.

(3) A lot of people in mourning who the nurse says look sad but mad.

(4) A guy who claims he waited till the green light come on.

(5) Another guy who the nurse says is muttering to himself about an outhouse—excuse me lady—and a fence and some trees.

(6) The county John-Laws.

(7) Another sort of a John-Law from the Department of Commerce.

Well, to tell the truth, it looks I am in deep in this thing. But something I hope will turn up—anyway it will not be my toes. So send the dopes in if they want to see me that bad.

But before you go, lady, will you remember that I don't want my name in the papers for no consideration? But also remember to spell it with two "z's," and it ends with an "N"—yes—"N" like in the word "anybody."

## Glider Crashes

(*Continued from page* 49)

and landing into it. Finally S-turns and 360-degree turns were executed. The whole demonstration, by persons in various stages of progress, proved very effective.

One difficulty is to gauge a person's ability to glide according to the number of flights he has had. That is, with no regard to the frequency with which he has made them nor his aptitude for flying. With over 30 members of various ages and physical qualifications in our club, great differences are to be noted.

Some have been good pilots from the start. Others will probably never learn

(*Continued on page* 62)

**PATENTS**

Time counts in applying for patents. Don't risk delay in protecting your ideas. Send sketch or model for instructions or write for FREE book, "How to Obtain a Patent" and "Record of Invention" form. No charge for information on how to proceed. Communications strictly confidential. Prompt, careful, efficient service. Clarence A. O'Brien, Registered Patent Attorney, 315B, Security Savings and Comm'l Bank Building (directly across street from Patent Office), Washington, D. C.

St. Louis
seen from the
CORONADO

On the fringe of the Theatre, Shopping and Business Districts, yet in a distinctly residential neighborhood.

You will find the Coronado a place for a day, a week or a month.

Four restaurants, Coffee Grill, Mammy Shop and the famous Pal-Lido Supper Club.

TARIFF FROM $3.00 A DAY

The Hotel Coronado
Saint Louis, Missouri

AVIATION
MECHANICS COURSE

Aviation is growing rapidly. Train to be an Aviation Mechanic. No other industry offers a brighter future, more interesting work or better pay.

Prepare for a good position in Aviation at one of the Curtiss-Wright Aeronautical Universities—leading Aviation Schools in the United States. A new Mechanics' Course provides the best preparation that you can possibly find.

Curtiss-Wright Aeronautical Universities are located at New York, Chicago, Los Angeles, Baltimore, Boston, Pittsburgh and 25 other leading cities. If you are looking for a real opportunity and a chance to make big money, mail this coupon for complete details about the Curtiss-Wright School near your home.

CURTISS-WRIGHT
AERONAUTICAL
UNIVERSITY
27 WEST 57th ST., NEW YORK, N. Y.

Curtiss-Wright Aeronautical University
27 West 57th Street, New York, N. Y.

Please send me complete details about your new Aviation Mechanics' Course.

Name .....

Address .....

City ..... State .....

## Zeppelin

(*Continued from page* 50)

11 rigid airships in Germany. Three were operated in commercial service by DELAG, six were owned by the army but were not equipped for military work and the remainder were the property of the navy likewise unprepared.

AS A sort of last-minute experiment, existing airships were rushed into service without adequate preparation. They were wholly unfitted for the work and the military authorities did not know their capabilities and limitations. It is true that those in commercial service had carried 37,200 passengers, had made 1,600 flights, remained aloft 3,200 hours and covered 90,000 miles without mishap, but when they were rushed into war work many were lost on their first venture.

Nevertheless, more were built, each one being more successful than the last. Everyone knows the story of Zeppelin raids on London and other Allied centers.

Although the war advanced rigid airship design more rapidly than any other cause, Count Zeppelin seemed to regard it as a kind of digression in the development of his ships. He considered them as commercial vehicles which, some day, would carry men and goods to all parts of the earth.

A few days before the war started, he and Prince Henry of Prussia, brother of the Kaiser, had returned from Spitzbergen where they had selected a site for an airship base for a projected flight over the North Pole. This, incidentally, was almost the same spot from which the Ellsworth-Amundsen expedition started in 1926.

The Count had also perfected plans for establishing three-day airship service over the Atlantic Ocean to America. He began construction of a ship for that purpose. In order to obtain a highly perfected personnel for the venture, he established a training school in which pupils made hundreds of theoretical flights over the Atlantic. Weather conditions for the past 25 years had been laboriously compiled from steamship logs.

"You will take the LZ-31 from Friedrichshafen to New York on June 10, 1904," he would tell a student. Thereupon the future pilot would chart his course according to meteorological conditions that had existed on that date, and during the days following, and would then remain on "duty" for the whole period required to complete such a journey.

FLYING the Atlantic on regular schedule was one of Count Zeppelin's fondest dreams, but he did not live to see such service established.

Even on his deathbed, and in spite of his suffering, he talked of his beloved airships—not as war destroyers but as peace-time engines of commerce and agents of civilization.

If you had attempted to find the aged inventor during the busy war period, you would have had a sizable job on your hands. He usually was "somewhere about the airship plant" at Friedrichshafen, but no one ever seemed to know exactly where.

He was spry in spite of his years, and walked many miles daily through factory departments, offices, laboratories and hangars. Although there was a nominal board of directors, the old man's word was law at the Zeppelin plant, and he always wanted to be on hand when there was some important experiment to oversee or other bit of work to observe.

If you failed to find the Count at the Zeppelin works, you might try the Kurgarten Hotel at Friedrichshafen. There he occupied one wing of the building with his living quarters and study. He divided his time about equally between hotel and factory. One in a while, he went on a brief trip to some nearby city, and sometimes did more extensive traveling in connection with his airship building activities.

IN HIS living room at the hotel you would find modern furniture of plain design, indicative of a man of simple but up-to-date tastes. The walls were covered with pictures of his beloved airships. Each photo, doubtless, recalled to him some experience more thrilling than any that had overtaken him while he was hunting wild animals or Confederate soldiers in America.

In a large cabinet you would find his medals, cups and other trophies and awards given him in honor of his work. Among them was the iron cross of the Order of the Black Eagle—highest award in Germany.

If you chanced to find the 78-year old airship builder, you would see a man much different from the one who heard his airship plans turned down back in 1894. But perhaps, not so different after all. He was still jovial and good natured even though weighed down with work and problems. And he was more energetic than many men of half his age.

Then, on March 8, 1917, and at the age of 79 years, Count Zeppelin died at Charlottenburg. Death followed a lung congestion resulting from exposure during the flight of one of his airships.

BUT he doubtless died with the conviction that his work would progress, even beyond the troubled days of the war. With great foresight, he had stipulated that the original Zeppelin endowment fund should be used for promoting airship travel in all parts of the world regardless of time, place or existing political conditions. This is being done today in Germany, England and America by building airliners larger than any Zeppelin ever constructed while the Count was alive.

**Stinson Detrioter Kit 75c P. P.** Full size blue prints come with this kit. Also sold separately for 20 cents.
Kit contains everything necessary to make a 2 ft. flying model. Lots of extra material included.
COMPLETE MATERIAL KIT $1.00 P. P.
See previous ad of this magazine for contents of Kit. Super "A" Grade Balsa 1/8 x 2 x 40 inches, 5c; 1/4 x 2 x 40 inches, 7c; 1/8 sq. x 40 inches, 8 for 5c; 1/4 sq. x 40 inches, 6 for 5c. Wood is cut in half for shipping unless 10c packing charge is included to cost of wood. Dummy motors, 18c each. Colored dope 7c, 1 oz., any color. Orders west of Mississippi add 10c extra. No orders under 50c, foreign coins, or stamps accepted. Send 2c stamp for complete price list of Model Airplane Supplies. Dealers write for discounts.
WOBURN MODEL AIRPLANE SHOP
19 Belmont St. Woburn, Mass.

BUILD NATIONAL'S FLYING MIDGET MODEL AIRPLANES 12"

MIDGET TEXACO Comp. Kit $1.10 Postpaid
wing spread 18 different models.
Colored tissue, balsasticks cement, fullsize plans, etc., included.
Send 5 cents for catalogue today
NATIONAL MODEL AIRCRAFT & SUPPLY CO.
29X North Ave., New Rochelle, N. Y.

NOW 35c

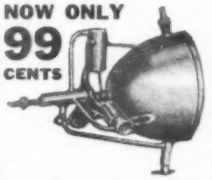
PROPELLERS
2" D. O. X. Propeller With Spinner
4 bladed, 10c each, $1.00 doz.
2 bladed 10c each, $1.00 doz.
Postage 3c on one or doz.
ALUMINUM, ADJUST. PITCH Propellers for Flying or Scale Models.
8" dia. 35c—10" dia. 50c
shaft bearing and hangar for — above 25c
3 Bladed Adj. Props with Shaft and Bearing
8" dia. 85c—10" dia. $1.00
Special Scale Model Die-Cast Propellers with Shaft and bushing:
3 1/2" dia. with Spinner (Hawk Type) ..... 50c
6 1/2" dia. with Spinner (Hawk Type) ..... 75c
6 1/2" dia. Standard Steel Type ..... 75c
5" dia. 3-Bladed with Spinner ..... 75c
Postage on any above propellers 3c each

| Standard Carved Propellers. Diameter | 6" | 7" | 8" | 9" | 10" | 11" | 12" |
|---|---|---|---|---|---|---|---|
| Balsawood | 45c | 52c | 60c | 68c | 75c | 83c | 90c |
| Basswood | 36c | 42c | 48c | 54c | 60c | 66c | 72c |

| Redicut Propeller Blanks. Standard Type | 6c | 7c | 8c | 9c | 10c | 11c | 12c |
|---|---|---|---|---|---|---|---|
| Basswood | | | | | | | |
| Balsawood | 8c | 10c | 12c | 14c | 16c | 18c | 20c |

Send 10 cents for Complete Catalog
Selley Mfg. Co., Inc. 1377-P Gates Ave. Brooklyn, New York

SPEED MODELS
Snappy high speed racing model kits. Just the plane for your radio or desk. 8 in. scale models with N. A. C. A. cowl and wheels finished. Wings and all other parts stamped and marked. Aluminum propeller. Postage paid.
DooLittles Laird Super 400 ..... $0.50
Gee Bee Super-Sportster ..... .50
Army Boeing Fighter P-12-B ..... .50
Travel Air Mystery Ship ..... .50
Lockhead Sirius...50 Winnie Mae Lockheed.. .50
Bowlus Soarer (Flying) 24-in wing ..... .50
GOLDEN ARROW MODELS
53 Vinewood Ave. Pontiac, Michigan

LOOK-FELLOWS-LOOK
Model Aviator-Featherweight Motor
For Use on Model Planes and Model Boats
New rock bottom prices. All parts bent, formed, timed and drilled. Knockdown 3-cyl Kit postpaid. Finished motor, postpaid, $2.95. Air Tank Kit, 3"x3"x 30" or smaller, postpaid, $1.95. Tank complete, ready to use 8"x24" or 30" long, postpaid, $4.95
NOW ONLY 99 CENTS

15 Model Plane Plans—All For $1.00 Postpaid
SE-5, Stinson, Fokker Triplane, Fokker Amph., S.P.A.D., Boeing, D-H Tiger Moth, Ansaldo, Travelair Mys. "S", Lockheed Vega, All Amer Rocket, Nieuport, Albatross D-III, Camel, Gloster.
3 Plans for 25c
Pfals Pursuit, Bernardi—French Fighter, Fokker D-VIII—Flying Razor. S6-B Supermarine Racer.
WATCH FOR 4 NEW PLANS EVERY MONTH
CATALOGUE 10c
DEALERS: WRITE FOR DISCOUNTS
Model Aviator Products, Dept. 11
3335 Eastwood Ave. CHICAGO

## Landing Problems

(*Continued from page 42*)

she would clear the fence at the east end it was a go, but should she hit the fence or mush into the swamp, my barnstorming trip was at an end.

I backed the plane up to the edge of a ditch at the west end of the field and put a small log in front of the wheels. The fence and the swamp seemed the best way out. When the OX-5 built up all the revs she'd do, I horsed the Jenny over the log and started off down-wind.

The heavy prop had been bad enough when taking-off into the wind at Gettysburg, but its lack of punch on the take-off downwind now proved to be nearly fatal for the Jenny. At the last moment, I saw she was not going to clear the fence. I cut the switch, ground-looped, and came to a stop with the perspiration running out of every pore and my knees knocking together like Spanish castanets.

ALREADY I had lost too much precious time if I were to reach home that night. I tried smoking a cigarette to calm the vibration in my knees, and then once more studied every angle of the situation. First, I paced off the dimensions of the field. A crosswind take-off was out of the question. In desperation, I then walked up the hill at the west end, sighted between the pine trees and down the field. The west wind was now increasing and coming in gusts, which lasted several minutes. There was just one chance left—a take-off toward the west and into the wind.

This would mean a sharp turn close to the ground between two pine trees. Banked up in a turn, the Jenny would go through. Levelled off, she would go to pieces for the trees were very close together.

From the tool compartment, I took out a precious piece of fabric and tore from it a strip, several inches wide and about five feet long. This improvised wind-indicator was planted some ten feet in the air on the end of a pole, held by a small boy standing in the middle of the field. The Jenny was then backed up to the east end of the field with her tail skag set on top of a fence post. My cue to go would be a gust of wind which would blow the fabric straight out.

The wait seemed interminable. One moment—two moments—then the string of fabric lifted on the wind, fluttered, and straightened out. The breeze strengthened—and I was on my way! From the time when my tail skag kissed that fence-post goodbye, until I warped the Jenny level on the other side of those pine trees, seemed the edge of eternity to me though it was really but a few seconds.

The Jenny was air-borne halfway down the field. It was no use to climb. What I needed was speed—and plenty of it. The slight knoll rose like a mountain before me. By holding the plane down, her speed was picking up. My left wing-tip was barely clearing the hillside on my left.

Now was the moment to start the turn—away from the hill and between the trees. I raised just enough so that my right wing would miss the ground, using plenty of aileron and flipper and banked up nearly vertical—whipping between the trees. For an instant, the Jenny settled as she raced downwind over the adjacent field. My heart was again in my mouth—but I had made it!

Straightened out, and headed for home, I began to review the whole proceeding. What the devil had I been in such a rush for anyway? A day's delay would have meant nothing to me in comparison to losing my plane. Furthermore, five or ten miles north of the city I now saw cut grain fields, which would have served me perfectly, and, all things considered, would have permitted my getting away just as quickly and with no risk.

Well, if nothing else had been gained, I had at least learned one thing. To shun the temptation of landing as closely as possible to an objective when there was risk involved. "The longest way round is the shortest way home," wasn't written by an aviator in a hurry. It was written by a lad who came back with the same plane with which he started out!

The following summer I was invited to fly the Jenny for a celebration at West Chester, Pa. I knew a lot of navy pilots, stationed at Anacostia, D. C., who were going with Hisso Voughts and DH's. It looked like a live week end, with a chance thrown in to knock over a few dollars carrying passengers. The boys gave me instructions for finding the field; which they described as a little rolling but otherwise O. K.

I ARRIVED over West Chester shortly before noon. There were the Navy Voughts and DH's parked at the east edge of the field, which was just a good old-fashioned Pennsylvania cow pasture — without the cows. I circled twice over it and took in the line-up. And it didn't look particularly good, either. The field appeared to be about half a mile square and the west, south and east sides were high. In the center, sloping from the south side, was a considerable draw which opened out to a stream-bed at the north edge of the field.

Along the west side was a long row of tall thick elm trees, immediately in back of which was the highway. Along the highway, ran high tension power lines strung on poles at least sixty feet high. The wind was fresh from the southwest. Heavy woods bordered the field on the east. To the north and east was rolling country, slightly higher than any part of the landing field. Scattered throughout this section were ing me in the face. Either I had to many large trees.

Below me lay those navy planes starland—or look forward to a fine assortment of horselaughs by the boys from Anacostia. With a sneaky feeling of misgiving, I came in from the northeast and landed into the wind and uphill.

The usual formalities of greeting attended to, I excused myself, and tried to figure out the best way of flying the Jenny out of the pocket in which I had landed. And the set-up had me worried. The navy boys, with their 200 horsepower Hisos and 400 horsepower Libertys, had little to worry about, but those who have always flown high-powered planes do not realize what a difference a few hundred horsepower can make.

If I took off toward the northwest crosswind, as the navy boys proposed to do, I was afraid of a downtrend at the foot of the hill where I would have to turn left and climb out over the high tension lines. And there is nothing prettier than a frying Jenny—straddling high tension wires! So that take-off was out.

As there was a sharp slope from the southwest corner, it looked as though that would help the Jenny pick up her speed and make a downwind hill take-off in order..

The trip to town for lunch gave me a temporary respite from my worries. When we returned to the field, we found that the populace of the town had gathered round, and no sooner had I reached the side of the Jenny than a prospect for a ride flaunted a five dollar bill in my face. Well, the Jenny needed gas and that five-spot would get me back to Annapolis.

Starting from the southwest corner, the Jenny raced downhill down wind. She staggered into the air when the low ground in the middle of the field eased out from under her. The air was hot and light. It was impossible to climb. My only chance was to hold her down, keep plenty of air speed and fly around obstacles rather than over them.

For five miles the Jenny tore along below the tops of the trees, dodging first one way and then the other. At last I got the plane turned into the wind. Then began a gradual climb. That passenger got a twenty minute ride instead of ten minutes—but I was in no hurry to land back in that field.

ONCE more safely on the ground and then another pay-ride showed up. I hesitated. This five dollars would be gravy. I wanted it and yet I didn't. The cross-wind take-off was taboo, because of the aforementioned high tension wires. There was, therefore, but one other way out—to get clear down in the northeast corner and take away into the wind uphill. Carefully I paced the line of take-off, studied the height of the trees from several points and finally decided that she'd make it.

The Jenny got off the ground about where I expected, but headed into the wind, my advance over the ground was slow. She climbed steadily with a safe margin of speed.

XUM

HOTEL
DELMONICO
PARK AVE at 59th STREET
NEW YORK
A
DISTINGUISHED
··NEW YORK··
RESIDENCE
··FOR THE··
TRANSIENT
····· OR ·····
PERMANENT
····GUEST····
HENRI C. PRINCE, Gen. Mgr.

## Randolph Field

(*Continued from page* 35)

ing sown to Bermuda grass, that plague of most flying fields, dust, is fortunately absent from Randolph Field.

Students are selected from several sources, the majority of them being Flying Cadets appointed from civil life or from the enlisted men of the Army, the latter receiving priority in appointment. They are either college graduates, or have to their credit, at least two years of college work.

In lieu of the required scholastic requirements, candidates for appointment as Flying Cadet must pass a rigid mental examination. They must be citizens of the United States, unmarried, and of age not below 20 nor above 27. The mental requirements are high, because Flying cadets are not trained to be pilots alone, but also to be officers of the Army in general.

A Flying Cadet is paid $75.00 per month during his training year, is given his uniforms free and a mess allowance of $1.00 per day. He wears a distinctive slate-blue uniform. Noncommissioned officers of the higher grades, who qualify for flying training, retain their noncommissioned rating and salary while they are undergoing flying training.

In the Fall of each year, the previous June class of West Point graduates sends a goodly number of young second lieutenants, who prefer a career in the Air Corps. Upon graduating from the Military Academy, these young officers are commissioned in branches of the Army other than the Air Corps. They can only be detailed to the Air Corps in order to fulfill their desire for flying training.

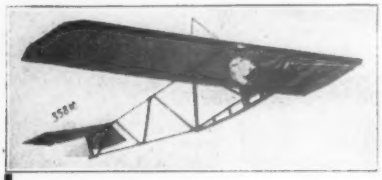
The duration of the course at the Primary School (Randolph Field) is eight months. An additional course of four months' training is taken at the Advanced Flying School at Kelly Field, making the total flying training period one year. The flying course at Randolph Field covers over 150 hours of flying, of which at least 60 hours are spent in training type and 90 hours in service type airplanes.

In the training type planes, the student is taught straight flying, climbs, climbing turns, eights, spirals, chandelles, glides, taxying, take-offs and landings, forced landings, stalls, spins, side-slips, rolls, half rolls, vertical renversements, 180-degree and 360-degree turns for landings, cross-wind take-offs and landings, accuracy, cross-country flying, formation flying, night flying and blind flying.

The ground subjects are Theory of Flight, Aerial Gunnery, Airplane Rigging, Engine Repairing and Trouble Shooting, Meteorology, Radio and Aerial Navigation.

The policy governing the elimination of inapt students is so rigidly followed that very few students, who undergo the primary flying course, are eliminated after they succeed in graduating from the Primary Flying School and transferred to the Advanced Flying School.

Upon graduation from the latter school, students are given their "Wings." The student officers are permanently commissioned in the Air Corps and the Flying Cadets and noncommissioned officers are commissioned Second Lieutenants in the Air Corps Reserve and placed on extended active duty. After a tour of duty with a tactical squadron, some of the former students at Randolph Field will return there and, after a course of instruction in the Instructors' School, will guide young fledglings in the ways of correct flying.


Rhon Ranger

The Challenger

NOW IS THE TIME to build your Rhon Ranger or Challenger! The season for outdoor activities is drawing to a close, contact with your friends at school is again renewed, and MEAD prices are more attractive than ever! Form your Glider Club and get started on the most fascinating bit of constructive work you ever undertook.

The increased buying power of the dollar, and better production facilities, enable us to offer substantial reductions in the world-famous line of Rhon Ranger Kits:

REGULAR KNOCKDOWN KIT, complete..... $ 79.00
COMBINATION No. 1 (with built-up ribs)..... 93.00
COMBINATION No. 3 (with ribs and metal fittings finished). 104.00
COMPLETE RHON RANGER, "FLYAWAY"..... 275.00

Our Group Purchase Plans have been proportionately reduced. For prices of supplies, see our advertisement elsewhere in this issue.

Our descriptive literature will interest you; send 10c for it today.

MEAD GLIDERS
Dept. F 12 S. Market St. Chicago, Illinois

TROUBLE SHOOTING
ON AVIATION MOTORS
Just the book for airplane owners and students, tells the many causes of motor trouble and their remedy:
Engine fails to start.
Engine misses at low or idling speed.
Engine misses at high speed.
Engine misses when idled down.
Engine fails to revolve up to proper R. P. M.
Engine stops suddenly.
Should oil gauge fail to show required pressure or none at all.
And many other symptoms and their source of trouble.
Only 50c
H. C. OLDERMAN, 10090 Elmira Ave., Detroit, Mich.

IDENTIFICATION WRISTLETS

Made in Sterling Silver $2.50 Each
Gold Filled $5.00 Each
Engraving 2c Per Letter
Emblems for Flying Schools and Clubs
ALL SORTS MEDALS ALL SPORTS
JOHNSON CO.
352 W. 13th St., "Wing Bldg.," New York
Write for Catalog "F"

# Dallas Aviation School and Air College

Love Field
Dallas, Tex.

*A Government Approved School*

# We Can Save Time And Money For Every Flying Student —

## *And We Can Prove It!*

### Our Prices

Compare them—you can't match them at any other first class school in America.

**Transport Course**
200 Air Hours
**$2500**

**Commercial Course**
50 Air Hours
**$795**

**Private Pilot's Course**
20 Air Hours
**$385**

**Master Mechanic's Course**
**$350**

Students learning Ford Tri-motor construction

**Can you imagine flying EVERY day—finishing in record-breaking time—in the best training ships flown—with a field that stays dry, skies that stay clear, climate that's mild and sunny ALL WINTER? This is the BEST school this far South—mighty few other government approved schools are half as well located for winter training. And as for prices—boy, just compare ours with other first-class schools!**

OUR STUDENTS get their training on "FLEETS." These ships cost $4,500.00 each. No better built.

Our INVESTMENT amounts to over $200,000.00. We own our own hangers, shops, cafe and dormitories.

Board and room at the field $10.00 per week. Every city convenience.

Our New Department!

**RADIO**

One of the biggest branches of aviation development—we have it for every student who wants it. New equipment, expert instruction.

*Prices Very Reasonable*

Nothing but up-to-date radial air cooled motors used.

WE GUARANTEE our courses to be as good or better than any other flying school any where—and our flying equipment to be second to none in the United States.

Special prices on tri-motored Ford instruction, also for any other course or special number of hours.

Ask any Pilot or Airport Manager anywhere.

We give you real training and real savings—not just promises.

Love Field is one of the biggest, busiest and best airports in America.

Boy—what a wallop you'll get out of your work here and living at Dallas and Love Field!

**We Pay Your Railroad Fare**

When you enroll for Transport or Commercial Course. Come by train—Bus—Drive your own car—come by Air—We pay just the same.

**Send for Our New Catalog NOW!**

# DALLAS AVIATION SCHOOL AND AIR COLLEGE

Major Bill Long, President
C. E. Harman, Gen. Mgr.

LOVE FIELD
DALLAS, TEX.

## Wingless Airplane

(*Continued from page* 18)

*operated in a gentle breeze blowing over the rotor wings.*

*"By the use of a rheostat, various rotor speeds could be obtained, thus varying the lifting force. With the rotor turning over rapidly, the model would rise, while slowing down the rotor would allow the model to descend.*

*"With the gentle breeze blowing, the model would rise rapidly without any forward run, and could also be made to hover in the air like a balloon when the speed of the rotor was carefully regulated. The wires would become slack while the model hovered, gently swaying to and fro."*

The fact that no propeller slip-stream nor strong wind was required for the satisfactory operation of this rotor wing indicates that it is possible to operate the combination under practical outdoor conditions with practically no run at all. This means that landings can be made in very restricted spaces and that take-offs are no longer a problem.

It is evident that this sort of construction adapts itself very readily to thick wing sections. The rotor can be made quite large in diameter without projecting beyond the general outline of the wings. In this position, the rotating cylinder skews the air-stream, thereby greatly increasing the lifting effect of the wings at low speeds, and tends to prevent the air-stream from breaking away from the top of the wing at very high angles.

The idea of a rotor is not altogether original with this particular ship, for it has been proposed by several other inventors from time to time. However, the detailed working out of the mechanical parts in Mr. Thompson's scheme, is quite a desirable arrangement. It will be remembered that a rotor plane, then being experimented with by the U. S. Navy, formed the cover subject for the December, 1930, issue of POPULAR AVIATION.

A combination of rotor and wing, such as described here, has a wide field of possibility. In taking off, landing, or for carrying very heavy loads at low speed, the rotor can run in connection with the wing surface. Then, if high speed is required, the rotor can be cut out of service with the wings acting alone. This should give an excellent speed range, which is the present demand of the aviation world.

"AN ADDRESS OF DISTINCTION"

You Get
So Much MORE

INTERNATIONALLY known . . . the habitual stopping place of world travelers . . . conveniently accessible to all Loop activities . . . foods of surpassing excellence. Spacious and smartly elegant rooms. Distinguished accomodations at remarkably reasonable cost. *Rates begin at $5 per day. Permanent Suites at Special Discounts*

The DRAKE HOTEL Chicago

*Under Blackstone Management*

## Archie Dodging

(*Continued from page* 52)

—first time in his life—have to be easy getting it out or the wings might pack up. He pulled back the throttle, centralized the joy stick and rudder. Yes, she was responding. There was some more Archie, but it was not like they had put up over the target.

Now she had straightened out—there was Nieuport and the floods—the last lap. Where was Sampson? Campbell glanced around. There he was about fifteen hundred feet above and behind. He had shaken off the Fokkers.

Once past Nieuport, Campbell pulled his radiator up inside the cowling and shut down his engine. Smith leaned over and shouted: "You got him in flames. Well done. Only seen one other shot down with a front gun. I sure got a bunch of thick rimmed cartridges this trip. Our escort must have run into a bunch up in the sun."

CAMPBELL beat his hands on his knees. They pained him as he came down out of the cold. So now he had gone all the way. Two more of those trips and his account with the Government would be square, according to the theory that three loads delivered to the target offset one's training expenses.

He gave her the gas again and held her nose down. Soon the aerodrome appeared in sight. Adjusting his incidence wheel for landing, he glided down. As the blades of grass rustled under his wheels, he gave a sigh of relief.

Campbell and Smith turned in their reports to the Adjutant. Commonplace matter-of-fact reports when written out in official form, but with a world of meaning behind them. Sampson entered, and after warmly congratulating Campbell, spread the news of his unusual accomplishments, none of which Jerry really could visualize, although he had rendered a report. Then the rest of the squadron gathered around him.

"Well done, Campbell, mighty fine for anyone—let alone a first flight," exclaimed Sampson. "First, our friend drops a lot of nice warm eggs square on the roofs of those torpedo shops. Accomplishment No. 1. Then not satisfied with this, he turns the old bomber into a combat ship and shoots down a Hun with his fixed gun. A regular afternoon's work, I'll say."

"The way that first load sounded to me," said Taylor, "it reached right into the center of those shops and gave the crews a nice long vacation. And what went 'bang' were not all Coopers, either—a few sub torpedoes went with them."

Jerry listened, almost unbelieving, but was brought back to earth, sickened, when he heard the voice of Squadron Commander Billings shouting, "Get lunch, boys. Start the engines again at two-thirty this afternoon, and see if we can finish the job that we started."

» WOOD that is STRONGER than SOLID STEEL «

VENCOR Glider Plywood—a 1-32 in. alder material meets all requirements for light planes and gliders. The standard panel measures 24 in. by 60 in. and will be sent to you for only $1.00 f.o.b. Chicago. Less than 10 panels shipped cut to 24 in. by 20 in.

PLYCOR and VENCOR are imported.

PLYCOR AIRCRAFT PLYWOOD represents the latest advance in scientific utilization of natural wood. Mighty hydraulic hot-plate presses transform three one-piece veneers of sturdy Baltic birch and a tested casein adhesive into a durable panel of balanced strength. This is PLYCOR AIRCRAFT PLYWOOD—a plywood which is stronger per pound weight than solid steel.

Write for the PLYCOR Data Sheet and read in detail why this plywood is specified by leading aeronautical engineers wherever stamina and reliability are essential. PLYCOR is furnished in standard sizes—thicknesses 1-32 of an inch and up—Let us quote on your requirements—WRITE TODAY!

THE PLYCOR COMPANY
1500 S. WESTERN AVE. Dept. 100 CHICAGO

## Airy Chat

(*Continued from page 6*)

*German planes, when some of his own planes went down out of control.*

*Please do not think, fellows, that I am for a minute trying to discredit anybody. I am not taking the part of any side. Only I like to hear the truth. I will admit that I am American born myself, coming to Canada in 1913, but that is not my reason, I think Colonel Rickenbacker is entitled to a square deal as well as the rest. I served three years and eight months with the C. E. F., and two years with the Air Force.*

*Why did you not tell us something of Captain Roy A. Brown and about him bringing down Germany's Ace-of-Aces, Baron Von Ritchofen—McGrigor? If you do, please don't get them mixed up, for there are two Captain Browns, you know. Captain Roy Brown is flying around up north here for the Western Canada Airways, having a whale of a time. Capt. Roy Brown, of the Western Canada Airways, who took a leading part in the search for the lost McAlpine party a couple of years ago, is also of overseas renown.*

Well, history is history, and veterans will be veterans. And there you are.

* * *

MOST of us will be interested in knowing that Count Zeppelin of dirigible fame was once a soldier in the Federal Army during the Civil War. His very interesting biography is a feature of this issue and is well worth reading.

Further, he first conceived the idea of a rigid dirigible while in the U. S. Army Balloon Corps, and this is something that has not yet been published. The author of Zeppelin's biography claims that all of the facts contained therein have been checked up by officials at the Goodyear-Zeppelin plant, Akron, O.

* * *

ABOUT two dozen subscribers, more or less, have suggested that we publish scale plans for the benefit of our model builders. These plans, according to the requests, are to show both wartime and present day ships that have achieved fame in one way or another. So, with a spirit to please, we will start a series of scale plans in our next issue with a complete layout of the Breguet—a famous French wartime bomber.

* * *

A PERFECT shower of letters followed the publication of the "peanut" baby racing plane in the November issue. I counted all of these letters up and they totaled 33 requests in all. Now, for the benefit of those who are still interested in the subject, we wish to say that the pilot of the little ship is Jack Irwin, and that the ship was built in Sacramento, Cal. Further than this, we have no address. I only wish we had.

* * *

DO YOU remember that we spoke of two collectors having large collections of wartime plane photographs? The one that had 750 photos and his companion that had only 500 pictures? Well, this record has been broken into pieces by another visitor to our offices, who remarked casually that he had accumulated over 1,600 wartime pictures and was ready to prove it! Well, well, J. F. H., you certainly win the great big prize.

* * *

ONE of the inhabitants of Tulsa, Okla., who modestly signs himself, F. D. S., has a whole lot of things on his mind that he is anxious to get rid of. His letter is way, way too long to print in its entirety, but we will take a few paragraphs of it, for it is mighty interesting and to the point.

*I am just letting you know that I am just one of the aviation fans, who has the interest of aviation so strongly to heart that I never attend aero races or stunting exhibitions.*

*You may think me nuts, maybe I am, but just the same I don't think that stunting and crashes are ever going to get aviation anywhere. A guy gets famous doing stunts, let us say, and then he gets bumped off, as he is certain to do. Then this is what the public says:*

*"See, that's just what I told you. Not even these expert flyers can get away with it. No, no, not for mine."*

*If the price of the ships would come down, as they are starting to do, and if these birds would stop throwing a scare into the public with their stunting, then there would be more ships in the air than you could count.*

*Freddy Lund got it, and the rest of them will get it in due time. I'm for canning this stuff, and if I had anything to do about making laws, there would be a nice stiff law against outside loops and all the rest of them.*

Races and stunting never did any industry any good, and we agree with you, F. D. S. Hundreds were killed in automobile races before the coming of the airplane, and this daredevil stuff tied up the automobile for many years. They used to even loop-the-loop with automobiles, and of course, the loops got them in turn. Finally, the automobile manufacturers cut down on this thing themselves, and there was less in the papers about the "deadly red-devils" as the stunt automobiles of that day were called.

* * *

I'M WILLING to bet that our amateur builders and pilots will be interested in a new department that we have started. Here, we give descriptions and show pictures of lightplanes, gliders and models built by our readers, and to show our good intentions, we are starting the new feature in this issue under the head of "What Our Readers Are Building."

This is going to be some mighty interesting and helpful stuff, but we wish to warn you that you fellows must keep it going. This department is to show what you are doing, and not being mind readers, we can't print the stuff until you take the time to send it in.

And there is always one thing that we are anxious to get with articles of this sort—that is, pictures. A good, clear, sharp photograph tells a whole story by itself and is almost necessary. Good snapshots are all right if they are sharp enough to show the details.

And when you write this story, just simply tell the interesting points in a clear, understandable way. Don't, in any case, write more than 500 words, and preferably less. If it is a lightplane, tell us what kind of an engine is installed and all the rest of the equipment.

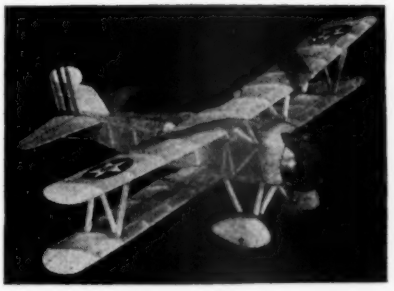
It is my opinion that this can be made one of the features of POPULAR AVIATION, and one of the snappiest—if you will help out.

Don't be afraid to give us the dope, just because you think that you can't

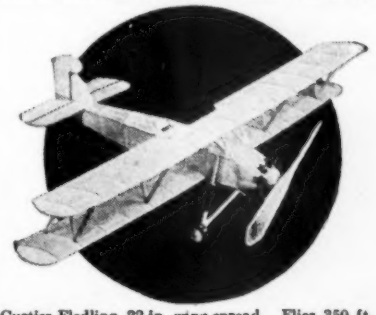
(*Continued on page 60*)

PATENT YOUR IDEAS REGISTER YOUR TRADE-MARK BY Z. H. POLACHEK 1234 BROADWAY 31st. NEW YORK
REG. PATENT ATTORNEY PROF ENGINEER
WHAT IS YOUR INVENTION?
Send me a simple sketch or model for
CONFIDENTIAL ADVICE
DO IT NOW

GUARANTEED TO FLY
CRESCENT SCALE MODELS



Curtiss Helldiver, 18 in. wing spread, 5½ oz. weight. Flies 300 ft. Construction Kit absolutely complete with all parts entirely or partly finished..$2.25 p. p.



Curtiss Fledling, 22 in. wing spread. Flies 350 ft. Perfect scale model. Semi-finished very complete construction kit.....$1.95 p. p.

Crescent Model Aircraft Supply Co.
1807 Benson Ave. BROOKLYN, N. Y

## Airy Chat

(*Continued from page 59*)

write an article. If you only give us the bare facts, we will re-write the matter for you. Remember, it's up to you to contribute.

* * *

VERY sorry, but a number of our English and Canadian readers felt rather hurt about certain remarks made in our last "Airy Chat." This was our reference to the Schneider Trophy race, and the relation of America to the final winning of the trophy. One typical specimen of the letters reads as follows:

*Your very unjust and unsportsmanlike remarks concerning the winning of the Schneider Trophy Race compel an indignant reply. The writer was either ignorant of the facts in the matter, or else he was deliberately making missstatements to cover America's incompetency.*

*Both the French and Italians withdrew, after they found that it was impossible for them to win, and even they did not take the attitude assumed by your editorial writer.*

*The chairman, appointed by the Italian contestants, applauded the magnificent work done by the English teams, and said that Italy was well satisfied that Great Brtiain had a right to this trophy. If they are satisfied that Great Britain acted in a sportsmanlike manner, after spending a great deal of money and effort, then America should be satisfied when she spent no time or money at all.*

This letter, signed by E. Bromley Spurling, Toronto, Canada, rather calls to mind a paragraph in a recent issue of the Italian aviation monthly, *Aviation Life in Italy*. Evidently, the Italians do not agree with Mr. Spurling, according to Carlo De Rysky who edits this paper. De Rysky writes as follows:

*The Italian planes, which were to compete for the Schneider Cup, were not yet quite ready, and like the French ones, still needed a few weeks' time to be able to share in the race. Italy and France asked, therefore, for a delay, which was not granted by the British Aero Club for organization motives.*

*This decision was very unfavorably commented on in all Italian aviation circles. It has been known, meanwhile, the race being over, that Pilot Agello has, in the course of repeated trials, by far surpassed the time record established at Calshot on Sept. 13th.*

We, who have no real interest in the matter, always like to see both sides to an argument represented, and we therefore publish the English and Italian views side-by-side. Take your pick—we're going back and sit on the fence.

HOW would you like to learn to fly—FREE—under government instructors and in accordance with U. S. Army methods? Well, that's just the little thing that we are going to try and arrange for you. This is the one big chance of a lifetime, and if you will get your friends to sign up on a petition that we are going to present to you, we feel that this dream might come true.

This will not only help thousands of young men to fly but it will also be of assistance to civilian schools, private airports and airplane builders. It, in short, is just the one big boost that aviation has been needing for a long, long time. Find further information elsewhere in this issue.

* * *

THROUGH some blunder in our editorial department, the wrong photograph was shown in the description of the Alexander Flyabout. The picture shown was an Eaglerock O. C. ship, of course, is only a relative of the Flyabout—a big brother, so to speak. Our apologies, please.

* * *

DO YOU own a new automobile that you would like to know more about? Well, "My Automobile" is a clean-cut clever book that you should read—or study. This sets forth all of the information that the owner of a car would need in driving and taking care of an automobile.

* * *

THEN, there is another new book to which we would like to call your attention, a book that hits home to all flyers and flying students. This is "Meteorology," by Donald S. Piston, a book that treats of weather conditions in a very simple concise manner. Within its 185 pages the atmosphere and its vagaries are covered without the usual intricacies and confusion found in many other volumes published on the subject.

* * *

THE Sperry Gyroscope Company wrote us a letter commenting upon the fact that the Sperry Horizon was not mentioned in the article, "The Senses vs. Instruments in Flying," printed in our November issue.

This instrument, it is true, is of great value to the pilot or student in blind-flying, but as it was impossible to mention all of the instruments individually in a general article of this sort, specific mention of the "Horizon" was omitted.

When flying visually, it is a comparatively simple matter to keep the wings parallel to the actual horizon, but in blind flying, where the true horizon is concealed, an instrument of this sort is of the greatest value.

By means of a short ruler on the dial of the instrument, which always maintains a horizontal position, the pilot is not compelled to depend upon the somewhat inaccurate sense of feeling. More on this subject will be published in POPULAR AVIATION.

(*Continued on page 64*)


**HAPPY LANDING!**

When you are "up in the air" about hotel accommodations in New York . . . glide down to a "happy landing" at the new Hotel Knickerbocker. . . Fireproof, magnificently appointed, genuinely friendly atmosphere. A step from Broadway and Times Square. Reserved rooms are choicest.

*Room with bath, $2.50 up*

HOTEL
KNICKERBOCKER
*One of New York's finest hotels*
120 W. 45th ST., NEW YORK
EDW. B. BELL, *Managing Director*

**HOW'S THIS FOR VALUE?**

We, the oldest exclusively Aeronautica Engineering School in the United States, make you the following Special Offer on our Home Study Courses. Men and Women thruout the United States and Foreign countries have paid $90. for these courses and know that they have received full value. You can receive exactly the same courses (only brought up to date) for $37.50. We reserve the right to withdraw this offer at any time.

AIRPLANE DESIGN: This course is for those who desire to become an Aviation Executive, Engineer, Salesman, Plant Manager, etc. This course covers Theory of Flight, Aerodynamics, Airfoils, Propellers, Performance, Construction, Equipment, Design of Monoplanes and Biplanes, etc. Text Book: Montieth & Carter. Also 8-inch Manheim Slide Rule.

AIR TRANSPORTATION: This course is for those who desire to become Transport Operators, Traffic Men, Agents, Supervisors, Airport Managers, etc. It covers Organization and Operation of Air Transport Lines; Rates; Traffic; Equipment; Income; Expenses; Airports, location, layout, and operation; Navigation; Meterology; etc. Text Books: 2 by Black and 1 by Duncan.

AIRPLANE DRAFTING: This course is for those who wish to become Draftsmen and Aeronautical Engineers. It covers Lettering; Dimensioning; Projection; Working Drawings of Airplanes, parts of Airplanes, Fittings, etc. Text Book: French's. Also a set of good quality Drafting Instruments, Board, Triangles, T Square, etc.—15 items in all.

WHAT YOU RECEIVE FOR YOUR MONEY
1. Text Books, etc. (See description of Courses)
2. 25 Study Guides
3. 25 Lectures
4. 25 Sets of Problems
5. Blue Prints
6. 4 Special Reports
7. Consulting Service
8. Diploma
9. Employment Service
10. School Pin (Gold Wings)

Why is it our students make good? The school is operated by Aeronautical Engineers. Men who have and are designing and stressing Airplanes and laying out Airports. Look up our President, Mr. Hugh L. Thompson, in any Aeronautical directory. Standard University Text Books are used. Also, you receive *Personal Attention*—Your answers to problems are studied and suggestions made, all with one point in view—to make you make good. You will be as much an integral part of our school as if you were here. You will enjoy the courses for they are extremely interesting. Only one Home Study student has ever dropped his course. Don't put this off. It's your opportunity. You know that there will be a lot of big jobs in this industry in the next few years and that you should be in one of them. Now is the time to prepare. Fill in the enrollment below.

Kindly enroll me in the ..... Course. You will find enclosed $15, down payment and I will pay $5. per month for 6 months, or I am enclosing $37.50 for complete payment. I am to receive free material and services as listed above.

Date.....Signed.....

Address.....St.....City.....State

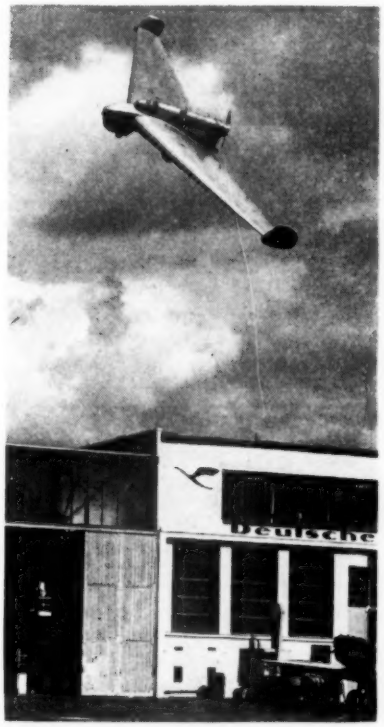
U.S. AIRCRAFT ENGINEERING SCHOOL
1732 GRAND AVE. Kansas City, Mo. DEPT. F

# Keep Abreast of Aviation Progress

**Popular Aviation is the outstanding favorite among non-technical readers who desire authoritative and up-to-the-minute information—written simply**

**For the Amateur**

Lightplanes
* * *
Gliders
* * *
Aero-Engines
* * *
Aero-Models
* * *
Construction
* * *
New Types
* * *
Inventions
* * *
Novel Kinks
* * *
Amateur Aviation




The Kohl "Flying Wing," just one feature of this month's issue, POPULAR AVIATION keeps you abreast of the times.

**For the Reader**

Aviation News
* * *
War Stories
* * *
Aero-Science
* * *
Discussions
* * *
Air-Travel
* * *
Adventure
* * *
Biographies
* * *
Fiction
* * *
Personal Experiences

POPULAR AVIATION, being the oldest of the non-technical aeronautical magazines, is distinctive. It is more than just another aviation magazine. Literally thousands of P. A. boosters attest to this fact.

When we ask you to join the growing list of P. A. subscribers, we are presenting a number of advantages for your consideration—and these are real benefits.

There is a distinct advantage in subscribing for POPULAR AVIATION for you receive your copy a full week before it is on sale at the news stand. Further, you receive it regularly.

New features of interest will appear this year, and many excellent articles have already been secured for the next issue. We are certain that POPULAR AVIATION will improve in the future as it has in the past.

**If you wish to enjoy all of the many advantages of a subscription, just fill out the coupon and mail it to us. Do not send any money—we will send you a bill later ($2.50 for one year).**

POPULAR AVIATION
608 S. Dearborn St.
Chicago, Ill.

Please enter my subscription to POPULAR AVIATION for one year. I want to be sure to get each copy as soon as it is off the press, before it can be purchased at the news stand. Send me a bill later for $2.50.

Name.....

Address.....

City.....State.....

**SEND IT NOW!**

***Before You Forget***

▼ ▼ ▼

**PAY US LATER**

## Glider Crashes

(*Continued from page 53*)

to glide properly. But the average member who glides regularly learns to co-ordinate the ailerons and rudder in about twelve tows and can be trusted on a free-stick flight after five or six take-offs with the stick tied.

Half a dozen tows close to the ground and then he smoothes up on the way he handles the elevator. Then he gets up higher and higher, learns to release safely, and finally gets onto a longer rope.

By the time he has had 40 or 50 flights, he gets a chance to make moderate banks and turns. These he follows by steeper ones, and if he does not develop the bad habit of diving too much on his turns, he is soon making circles and spot landings.

## Stop Telling

(*Continued from page 14*)

tried to cover up the cause of a "washout."

When it comes to gambling with the lives of passengers, the air-lines of this country are overstepping themselves, and it's just about time that some one threw a monkey wrench into the proper machinery. The mail must go through, and the pilots are willing to take it through, but they don't want a passenger to worry about on stormy days. And they can get along without the back-seat driving of the Super.

Just because a pilot passes a pretty severe medical test every so often, it doesn't mean that he has a Cast Iron constitution and can fly indefinitely. One "run" should be enough for any pilot, and no condition should ever be allowed to arise where he has to take a second run in the same day.

SOME pilots in this country have enough of a reputation to tell the Super to go soak his head in a vinegar barrel, and the Super has to like it. But what about our youngsters in the flying game who have not yet established a reputation for themselves. This coming generation is going to need some legislation to allow them to use their own heads when flying, and not the ivory dome of some benighted superintendent.

Here's another case of—(you name it and the author will agree with you).

A pilot was flying into a Pacific Coast field at night in a fog. He had landed at this same field for several years under the same conditions, and this field was at the end of his run. When his landing gear was just about ready to kiss the ground, he received a message through his radio to pull out of the field and go to another city about one hundred miles distant.

The Super afterwards said that he thought the landing was too dangerous under the conditions. The mere fact that the pilot had landed on the field several thousand times under worse conditions made no difference. If there was a passenger to take out, we would have a different story.

The pilot took off again through the fog, and washed himself out about an hour later on a mountain top. Few, among non-flyers realize, that when a pilot is forced to change his mind, after he has plotted out a course, the usual result is a washout.

It is the same in any occupation. Once you have gone over a situation in your mind, and have about decided what is the proper thing to do, you can't change your mind to a new idea and carry it out properly without taking time to think the thing out again. In the air, time is one thing you haven't much of, and the result is a washout for the pilots whose minds have been changed for them by Supers.

UNDER the above conditions, the pilot's mind will cease to function properly for the next few moments and as a rule his instruments will mean nothing in his young life until his mind has worked out another course. Now, if a mountain happens to sneak up on him in the meantime, it's just too bad. Pilots will come and pilots will go, but the Super is always right. And again that's that, and it's just too bad.

It's just about time that some kind hearted Congressman put some claws and teeth in some of these Department Regulations, and give the pilot complete charge of the ship he is flying. Passenger pilots are only human and they want to fly, they like it, but let's fix it so they can use their own heads and let the Super use his for a hat rack. If they have to smash up, these cloud cleavers should be allowed to pick their own spot.


**Advertise in this Directory. Write for rates.** **DIRECTORY** **One-Inch Advertisements. No more — no less.**

**MODEL AIRPLANE SUPPLIES**
Send your name and address for a sample of Balsa Wood and our prices on model airplane supplies.
**Aero Shop, 3050 Hurlbut Ave., Detroit, Mich.**

*Send Dime for largest catalog*
**EVERYTHING FOR THE LIGHT AIRPLANE**
*New, large, modern plant*
**LIGHTPLANE SUPPLY**
**6541 San Benita** **Saint Louis, Mo.**

BREDOUW-HILLIARD AEROMOTIVE CORPORATION
**GENERAL AIRPLANE SUPPLIES**
Write for new general supply catalog
Municipal Airport, Kansas City, Missouri

**Federal and State Approved**
**Penn School of Aviation**
**PITTSBURGH-BUTLER AIRPORT**
**CURTISS-BETTIS AIRPORT**
**HARRISBURG AIRPORT**
**Central Office - 724 Oliver Bldg. - Pittsburgh, Pa.**

LICENSED Plans to build the Crawford Powered Gliders. You must build from approved plans by January first. Here they are, at less than one percent of their actual cost. Boys, get busy this winter and build that licensed airplane, and have real sport next summer. Enclose two dimes for our detailed information. Discount to clubs and trade schools. Crawford Powered Glider Mfgr. Seal Beach, California.

**Roosevelt Aviation School, Inc.**
Government Approved for
Private, L. C. and Transport, Ground and Flying Courses.
**119 West 57th St., New York City** **Roosevelt Field Mineola, N. Y.**

**FULL SIZE PLANS**
**FOR THESE FAMOUS FLYING MODELS**
**20c EACH**
Flying Glory—27-in. wing span
Fledgling—22-in. wing span
Cabinaire—24-in. wing span
Curtiss Falcon—17-in. wing span
Navy Hell Diver—18-in. wing span
5c brings our catalogue
**CRESCENT MODEL AIRCRAFT SUPPLY**
**1807 Benson Ave.** **Brooklyn, New York**

**YOUNG DESIGNERS**
We will assist you in checking the strength and aerodynamic characteristics of your design.
*Reasonable fees*
**BRUCE SMITH**
**Airplane Design — Stress Analysis**
**WICHITA, KANSAS**

**Aeronautical Research and Consulting Engineers**
Factory Planning Airport Development
Aircraft Designs—Models—Drafting—Etc.
Technical Advisors to Picture Studios, Radio Stations, Newspapers, etc.
Travel Anywhere — Foreign and National
Special Rates for January only.
**WM. B. HARTY & CO., Box 22, Findlen, Mass., U.S.A.**

New 1932 Ships—Flyaway $495.00, new production motors complete with propeller and radiator, only $195.00, quality propellers $4.98 up, New Super Heath Parasol with new spare motor worth $1,200.00, only $498.00; photo and all information, including leather bound flying manual, 25 cents stamps.
**HIBBS, Fort Worth, Texas**

## Clasified Advertisements

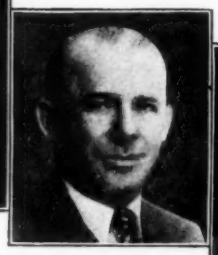
SNOW SLEDS. While they last—used airplane fuselages fitted with skils, $75.00 and up. Can be powered with a motorcycle engine. ENJOY THIS GREAT WINTER SPORT. Converted Henderson engines as low as $190.00. Propellers, $18.00. Heath Aircraft Corporation, Dept. NR-21, Niles, Michigan.

"Used Airplane Bargains. $155 and up. Folder, 10c. Federal Equipment Co., Box 911, Cincinnati."

BE SURE that the motor you purchase for your light plane will fly it. HEATH B-4 and HEATH HENDERSON motors are guaranteed to fly and 7 years of constant performance prove it. For economy and reliability these motors cannot be equaled. Send 15c for large illustrated booklet. Heath Aircraft Corp., Dept. KR-21, Niles, Michigan.

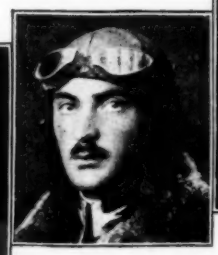
# YOU can be one of these Men!

**Aircraft Draftsmen**
*Salary, $50 to $100 a week*



**Airport Managers**
*At $100 to $150 a week*

**Airplane Salesmen**
*Make $50 to $100 a week and UP*



**Pilots**
*Earn $3,000 to $6,000 a year*

**Aircraft Mechanics**
*Make $50 to $100 a week*

# I'll show You how..

## *to earn $50 to $100 a week in Aviation!*

YOU MEN who are sick of small pay and hard, grinding work—here's your chance! Edward Dick took my course and received an immediate offer of a fine job as Chief Mechanic and Assistant Manager. Paul Boehn connected with a big airplane manufacturer. Ira Bergen left his old job to become Chief Draftsman with an aeronautical concern in Brooklyn—And many more have turned their backs on low-paid drudgery to take *real* jobs in *Aviation*.

### All You Need Is Ambition

If you've got red blood and an ounce of grit in your make-up, then you'll like the fascinating, active, adventuresome life that Aviation offers. I'll train you for it—right in your own home. Don't give up your job! Don't go to a strange city! Stay right where you are: I'll bring the whole Aviation Industry to you. My course is written in easy, simple language—hundreds of photos and charts make everything clear. You don't need a high-school education; many of my most successful students never finished the grades—in Aviation you need *practical* knowledge *only!* I teach you practical facts about airplanes, engines, airports, mechanical details and shop kinks that you can use right on the job.

### I Showed Mengel

"I am now working as a motor mechanic for the Wright Aeronautical Corp. I am sure that without the training your course gave me, it would be impossible for me to hold this job. The rich rewards go only to the man who uses his head and learns the theory on which the practice is based." Warren Mengel, 1301 N. 11th St., Reading, Pa.

### I Showed Moneypenny

"I'm mighty glad I tied up with Hinton. Your organization has always been ready to help me in every way. Before actually completing your course I was able to obtain and hold the responsible position of chief engineer with the Airsled people." C. H. Moneypenny, Cedarville, Mich.

**Walter Hinton**

Former Navy flier, *first* to pilot a plane across the Atlantic (The NC-4), first to use an airplane in exploration work, instructor of war-time fliers at Pensacola, Florida. His proven home study Course, endorsed by prominent fliers and aircraft manufacturers, prepares you for a real future in Aviation—as a Field Superintendent, Airport Manager, Plane Mechanic, Engine Mechanic, Air Traffic Manager, Pilot, Engine Expert, Airplane Assemblyman—or in any one of forty other highly paid jobs on the ground or in the air.

### Employment Service FREE of Extra Cost

Just as soon as you are trained, my Nation-wide Employment Department will help you find the job you want. This service comes to you absolutely FREE of any extra cost. It's getting results, getting real jobs, for other ambitious men, and can for YOU.

### Save $50 to $450 on Your Flying Time

I've arranged with flying schools all over the country to give special discounts to graduates of my ground school. Often these discounts save you much more than the whole cost of my course! You get a discount check worth actual CASH as soon as you graduate.

### Get the Facts—FREE

Send for my big book of facts about YOUR OPPORTUNITY in Aviation TODAY. It's free—you don't obligate yourself in any way. This book has been the turning point to success for many other fellows—it will show YOU, too, the way to *big success* and *big pay* in Aviation. Just mail that coupon NOW!

## Aviation Institute of U. S. A., Inc.

**WALTER HINTON, Pres.**

**1115 Conn. Ave., N. W. Washington, D. C.**

*Please send me your FREE book,* "WINGS OF OPPORTUNITY," *showing how I can train at home for a place in Aviation.* 736-H

NAME_____
*Please Print Your Name*

ADDRESS_____ AGE_____
*Please Print* *(Must be 18 or over)*

CITY_____ STATE_____

## Airy Chat

(*Continued from page 59*)

write an article. If you only give us the bare facts, we will re-write the matter for you. Remember, it's up to you to contribute.

* * *

VERY sorry, but a number of our English and Canadian readers felt rather hurt about certain remarks made in our last "Airy Chat." This was our reference to the Schneider Trophy race, and the relation of America to the final winning of the trophy. One typical specimen of the letters reads as follows:

*Your very unjust and unsportsmanlike remarks concerning the winning of the Schneider Trophy Race compel an indignant reply. The writer was either ignorant of the facts in the matter, or else he was deliberately making missstatements to cover America's incompetency.*

*Both the French and Italians withdrew, after they found that it was impossible for them to win, and even they did not take the attitude assumed by your editorial writer.*

*The chairman, appointed by the Italian contestants, applauded the magnificent work done by the English teams, and said that Italy was well satisfied that Great Brtiain had a right to this trophy. If they are satisfied that Great Britain acted in a sportsmanlike manner, after spending a great deal of money and effort, then America should be satisfied when she spent no time or money at all.*

This letter, signed by E. Bromley Spurling, Toronto, Canada, rather calls to mind a paragraph in a recent issue of the Italian aviation monthly, *Aviation Life in Italy*. Evidently, the Italians do not agree with Mr. Spurling, according to Carlo De Rysky who edits this paper. De Rysky writes as follows:

*The Italian planes, which were to compete for the Schneider Cup, were not yet quite ready, and like the French ones, still needed a few weeks' time to be able to share in the race. Italy and France asked, therefore, for a delay, which was not granted by the British Aero Club for organization motives.*

*This decision was very unfavorably commented on in all Italian aviation circles. It has been known, meanwhile, the race being over, that Pilot Agello has, in the course of repeated trials, by far surpassed the time record established at Calshot on Sept. 18th.*

We, who have no real interest in the matter, always like to see both sides to an argument represented, and we therefore publish the English and Italian views side-by-side. Take your pick—we're going back and sit on the fence.

HOW would you like to learn to fly—FREE—under government instructors and in accordance with U. S. Army methods? Well, that's just the little thing that we are going to try and arrange for you. This is the one big chance of a lifetime, and if you will get your friends to sign up on a petition that we are going to present to you, we feel that this dream might come true.

This will not only help thousands of young men to fly but it will also be of assistance to civilian schools, private airports and airplane builders. It, in short, is just the one big boost that aviation has been needing for a long, long time. Find further information elsewhere in this issue.

* * *

THROUGH some blunder in our editorial department, the wrong photograph was shown in the description of the Alexander Flyabout. The picture shown was an Eaglerock O. C. ship, of course, is only a relative of the Flyabout—a big brother, so to speak. Our apologies, please.

* * *

DO YOU own a new automobile that you would like to know more about? Well, "My Automobile" is a clean-cut clever book that you should read—or study. This sets forth all of the information that the owner of a car would need in driving and taking care of an automobile.

* * *

THEN, there is another new book to which we would like to call your attention, a book that hits home to all flyers and flying students. This is "Meteorology," by Donald S. Piston, a book that treats of weather conditions in a very simple concise manner. Within its 185 pages the atmosphere and its vagaries are covered without the usual intricacies and confusion found in many other volumes published on the subject.

* * *

THE Sperry Gyroscope Company wrote us a letter commenting upon the fact that the Sperry Horizon was not mentioned in the article, "The Senses vs. Instruments in Flying," printed in our November issue.

This instrument, it is true, is of great value to the pilot or student in blind-flying, but as it was impossible to mention all of the instruments individually in a general article of this sort, specific mention of the "Horizon" was omitted.

When flying visually, it is a comparatively simple matter to keep the wings parallel to the actual horizon, but in blind flying, where the true horizon is concealed, an instrument of this sort is of the greatest value.

By means of a short ruler on the dial of the instrument, which always maintains a horizontal position, the pilot is not compelled to depend upon the somewhat inaccurate sense of feeling. More on this subject will be published in POPULAR AVIATION.

(*Continued on page 64*)


**HAPPY LANDING!**

**When you are "up in the air" about hotel accommodations in New York . . . glide down to a "happy landing" at the new Hotel Knickerbocker. . . Fireproof, magnificently appointed, genuinely friendly atmosphere. A step from Broadway and Times Square. Reserved rooms are choicest.**

***Room with bath, $2.50 up***

HOTEL
**KNICKERBOCKER**
***One of New York's finest hotels***
**120 W. 45th ST., NEW YORK**
**EDW. B. BELL, *Managing Director***

**HOW'S THIS FOR VALUE?**

We, the oldest exclusively Aeronautical Engineering School in the United States, make you the following Special Offer on our Home Study Courses. Men and Women thruout the United States and Foreign countries have paid $90. for these courses and know that they have received full value. You can receive exactly the same courses (only brought up to date) for $37.50. We reserve the right to withdraw this offer at any time.

AIRPLANE DESIGN: This course is for those who desire to become an Aviation Executive, Engineer, Salesman, Plant Manager, etc. This course covers Theory of Flight, Aerodynamics, Airfoils, Propellers, Performance, Construction, Equipment, Design of Monoplanes and Biplanes, etc. Text Book: Montieth & Carter. Also 8-inch Manheim Slide Rule.

AIR TRANSPORTATION: This course is for those who desire to become Transport Operators, Traffic Men, Agents, Supervisors, Airport Managers, etc. It covers Organization and Operation of Air Transport Lines; Rates; Traffic; Equipment; Income; Expenses; Airports, location, layout, and operation; Navigation; Meterology; etc. Text Books: 2 by Black and 1 by Duncan.

AIRPLANE DRAFTING: This course is for those who wish to become Draftsmen and Aeronautical Engineers. It covers Lettering; Dimensioning; Projection; Working Drawings of Airplanes, parts of Airplanes, Fittings, etc. Text Book: French's. Also a set of good quality Drafting Instruments, Board, Triangles, T Square, etc.—15 items in all.

**WHAT YOU RECEIVE FOR YOUR MONEY**
1. Text Books, etc. (See description of Courses)
2. 25 Study Guides
3. 25 Lectures
4. 25 Sets of Problems
5. Blue Prints
6. 4 Special Reports
7. Consulting Service
8. Diploma
9. Employment Service
10. School Pin (Gold Wings)

Why is it our students make good? The school is operated by Aeronautical Engineers. Men who have and are designing and stressing Airplanes and laying out Airports. Look up our President, Mr. Hugh L. Thompson, in any Aeronautical directory. Standard University Text Books are used. Also, you receive *Personal Attention*—Your answers to problems are studied and suggestions made, all with one point in view—to make you make good. You will be as much an integral part of our school as if you were here. You will enjoy the courses for they are extremely interesting. Only one Home Study student has ever dropped his course. Don't put this off. It's your opportunity. You know that there will be a lot of big jobs in this industry in the next few years and that you should be in one of them. Now is the time to prepare. Fill in the enrollment below.

Kindly enroll me in the ..... Course. You will find enclosed $15. down payment and I will pay $5. per month for 6 months, or I am enclosing $37.50 for complete payment. I am to receive free material and services as listed above.

Date..... Signed.....

Address..... St..... City..... State.....

**U. S. AIRCRAFT ENGINEERING SCHOOL**

1732 GRAND AVE. Kansas City, Mo. DEPT. F


XUM

# Keep Abreast of Aviation Progress

**Popular Aviation is the outstanding favorite among non-technical readers who desire authoritative and up-to-the-minute information — written simply**

**For the Amateur**

Lightplanes
* * *
Gliders
* * *
Aero-Engines
* * *
Aero-Models
* * *
Construction
* * *
New Types
* * *
Inventions
* * *
Novel Kinks
* * *
Amateur Aviation

The Kohl "Flying Wing," just one feature of this month's issue, POPULAR AVIATION keeps you abreast of the times.

**For the Reader**

Aviation News
* * *
War Stories
* * *
Aero-Science
* * *
Discussions
* * *
Air-Travel
* * *
Adventure
* * *
Biographies
* * *
Fiction
* * *
Personal Experiences

POPULAR AVIATION, being the oldest of the non-technical aeronautical magazines, is distinctive. It is more than just another aviation magazine. Literally thousands of P. A. boosters attest to this fact.

When we ask you to join the growing list of P. A. subscribers, we are presenting a number of advantages for your consideration—and these are real benefits.

There is a distinct advantage in subscribing for POPULAR AVIATION for you receive your copy a full week before it is on sale at the news stand. Further, you receive it regularly.

New features of interest will appear this year, and many excellent articles have already been secured for the next issue. We are certain that POPULAR AVIATION will improve in the future as it has in the past.

**If you wish to enjoy all of the many advantages of a subscription, just fill out the coupon and mail it to us. Do not send any money—we will send you a bill later ($2.50 for one year).**

POPULAR AVIATION
608 S. Dearborn St.
Chicago, Ill.

Please enter my subscription to POPULAR AVIATION for one year. I want to be sure to get each copy as soon as it is off the press, before it can be purchased at the news stand. Send me a bill later for $2.50.

Name.....

Address.....

City.....State.....

**SEND IT NOW!**

***Before You Forget***

▼ ▼ ▼

**PAY US LATER**

## Glider Crashes

(*Continued from page 53*)

to glide properly. But the average member who glides regularly learns to co-ordinate the ailerons and rudder in about twelve tows and can be trusted on a free-stick flight after five or six take-offs with the stick tied.

Half a dozen tows close to the ground and then he smoothes up on the way he handles the elevator. Then he gets up higher and higher, learns to release safely, and finally gets onto a longer rope.

By the time he has had 40 or 50 flights, he gets a chance to make moderate banks and turns. These he follows by steeper ones, and if he does not develop the bad habit of diving too much on his turns, he is soon making circles and spot landings.

## Stop Telling

(*Continued from page 14*)

tried to cover up the cause of a "washout."

When it comes to gambling with the lives of passengers, the air-lines of this country are overstepping themselves, and it's just about time that some one threw a monkey wrench into the proper machinery. The mail must go through, and the pilots are willing to take it through, but they don't want a passenger to worry about on stormy days. And they can get along without the back-seat driving of the Super.

Just because a pilot passes a pretty severe medical test every so often, it doesn't mean that he has a Cast Iron constitution and can fly indefinitely. One "run" should be enough for any pilot, and no condition should ever be allowed to arise where he has to take a second run in the same day.

SOME pilots in this country have enough of a reputation to tell the Super to go soak his head in a vinegar barrel, and the Super has to like it. But what about our youngsters in the flying game who have not yet established a reputation for themselves. This coming generation is going to need some legislation to allow them to use their own heads when flying, and not the ivory dome of some benighted superintendent.

Here's another case of—(you name it and the author will agree with you).

A pilot was flying into a Pacific Coast field at night in a fog. He had landed at this same field for several years under the same conditions, and this field was at the end of his run. When his landing gear was just about ready to kiss the ground, he received a message through his radio to pull out of the field and go to another city about one hundred miles distant.

The Super afterwards said that he thought the landing was too dangerous under the conditions. The mere fact that the pilot had landed on the field several thousand times under worse conditions made no difference. If there was a passenger to take out, we would have a different story.

The pilot took off again through the fog, and washed himself out about an hour later on a mountain top. Few, among non-flyers realize, that when a pilot is forced to change his mind, after he has plotted out a course, the usual result is a washout.

It is the same in any occupation. Once you have gone over a situation in your mind, and have about decided what is the proper thing to do, you can't change your mind to a new idea and carry it out properly without taking time to think the thing out again. In the air, time is one thing you haven't much of, and the result is a washout for the pilots whose minds have been changed for them by Supers.

UNDER the above conditions, the pilot's mind will cease to function properly for the next few moments and as a rule his instruments will mean nothing in his young life until his mind has worked out another course. Now, if a mountain happens to sneak up on him in the meantime, it's just too bad. Pilots will come and pilots will go, but the Super is always right. And again that's that, and it's just too bad.

It's just about time that some kind hearted Congressman put some claws and teeth in some of these Department Regulations, and give the pilot complete charge of the ship he is flying. Passenger pilots are only human and they want to fly, they like it, but let's fix it so they can use their own heads and let the Super use his for a hat rack. If they have to smash up, these cloud cleavers should be allowed to pick their own spot.


Advertise in this Directory. Write for rates.

**DIRECTORY**

One-Inch Advertisements. No more — no less.

**MODEL AIRPLANE SUPPLIES**
Send your name and address for a sample of Balsa Wood and our prices on model airplane supplies.
Aero Shop, 3050 Hurlbut Ave., Detroit, Mich.

*Send Dime for largest catalog*
**EVERYTHING FOR THE LIGHT AIRPLANE**
*New, large, modern plant*
**LIGHTPLANE SUPPLY**
6541 San Bonita Saint Louis, Mo.

**BREDOUW-HILLIARD AEROMOTIVE CORPORATION**
GENERAL AIRPLANE SUPPLIES
Write for new general supply catalog
Municipal Airport, Kansas City, Missouri

Federal and State Approved
**Penn School of Aviation**
PITTSBURGH-BUTLER AIRPORT
CURTISS-BETTIS AIRPORT
HARRISBURG AIRPORT
Central Office - 724 Oliver Bldg. - Pittsburgh, Pa.

LICENSED Plans to build the Crawford Powered Gliders. You must build from approved plans by January first. Here they are, at less than one percent of their actual cost. Boys, get busy this winter and build that licensed airplane, and have real sport next summer. Enclose two dimes for our detailed information. Discount to clubs and trade schools. Crawford Powered Glider Mfgr. Seal Beach, California.

**Roosevelt Aviation School, Inc.**
Government Approved for
Private, L. C. and Transport,
Ground and Flying Courses.
119 West 57th St., New York City
Roosevelt Field Mineola, N. Y.

**FULL SIZE PLANS**
FOR THESE FAMOUS FLYING MODELS
**20c** EACH
Flying Glory—27-in. wing span
Fledgling—22-in. wing span
Cabinaire—24-in. wing span
Curtiss Falcon—17-in. wing span
Navy Hell Diver—18-in. wing span
5c brings our catalogue
CRESCENT MODEL AIRCRAFT SUPPLY
1807 Benson Ave. Brooklyn, New York

**YOUNG DESIGNERS**
We will assist you in checking the strength and aerodynamic characteristics of your design.
*Reasonable fees*
BRUCE SMITH
Airplane Design — Stress Analysis
WICHITA, KANSAS

**Aeronautical Research and Consulting Engineers**
Factory Planning Airport Development
Aircraft Designs—Models—Drafting—Etc.
Technical Advisors to Picture Studios, Radio Stations, Newspapers, etc.
Travel Anywhere — Foreign and National
Special Rates for January only.
WM. B. HARTY & CO., Box 22, Findlen, Mass., U.S.A.

**Clasified Advertisements**

SNOW SLEDS. While they last—used airplane fuselages fitted with skils, $75.00 and up. Can be powered with a motorcycle engine. ENJOY THIS GREAT WINTER SPORT. Converted Henderson engines as low as $190.00. Propellers, $18.00. Heath Aircraft Corporation, Dept. NR-21, Niles, Michigan.

"Used Airplane Bargains. $155 and up. Folder, 10c. Federal Equipment Co., Box 911, Cincinnati."

New 1932 Ships—Flyaway $495.00, new production motors complete with propeller and radiator, only $195.00, quality propellers $4.98 up, New Super Heath Parasol with new spare motor worth $1,200.00, only $498.00; photo and all information, including leather bound flying manual, 25 cents stamps.
**HIBBS, Fort Worth, Texas**

BE SURE that the motor you purchase for your light plane will fly it. HEATH B-4 and HEATH HENDERSON motors are guaranteed to fly and 7 years of constant performance prove it. For economy and reliability these motors cannot be equaled. Send 15c for large illustrated booklet. Heath Aircraft Corp., Dept. KR-21, Niles, Michigan.


XUM

# YOU can be one of these Men!

Aircraft Draftsmen
*Salary, $50 to $100 a week*

Airport Managers
*At $100 to $150 a week*

Airplane Salesmen
*Make $50 to $100 a week and UP*

Pilots
*Earn $3,000 to $6,000 a year*

Aircraft Mechanics
*Make $50 to $100 a week*

# I'll show You how..

## *to earn $50 to $100 a week in Aviation!*

YOU MEN who are sick of small pay and hard, grinding work—here's your chance! Edward Dick took my course and received an immediate offer of a fine job as Chief Mechanic and Assistant Manager. Paul Boehn connected with a big airplane manufacturer. Ira Bergen left his old job to become Chief Draftsman with an aeronautical concern in Brooklyn—And many more have turned their backs on low-paid drudgery to take *real* jobs in *Aviation*.

### All You Need Is Ambition

If you've got red blood and an ounce of grit in your make-up, then you'll like the fascinating, active, adventuresome life that Aviation offers. I'll train you for it—right in your own home. Don't give up your job! Don't go to a strange city! Stay right where you are: I'll bring the whole Aviation Industry to you. My course is written in easy, simple language—hundreds of photos and charts make everything clear. You don't need a high-school education; many of my most successful students never finished the grades—in Aviation you need *practical* knowledge *only!* I teach you practical facts about airplanes, engines, airports, mechanical details and shop kinks that you can use right on the job.

### I Showed Mengel

"I am now working as a motor mechanic for the Wright Aeronautical Corp. I am sure that without the training your course gave me, it would be impossible for me to hold this job. The rich rewards go only to the man who uses his head and learns the theory on which the practice is based." Warren Mengel, 1301 N. 11th St., Reading, Pa.

### I Showed Moneypenny

"I'm mighty glad I tied up with Hinton. Your organization has always been ready to help me in every way. Before actually completing your course I was able to obtain and hold the responsible position of chief engineer with the Airaled people." C. H. Moneypenny, Cedarville, Mich.

**Walter Hinton**

Former Navy flier, *first* to pilot a plane across the Atlantic (The NC-4), first to use an airplane in exploration work, instructor of war-time fliers at Pensacola, Florida. His proven home study Course, endorsed by prominent fliers and aircraft manufacturers, prepares you for a real future in Aviation—as a Field Superintendent, Airport Manager, Plane Mechanic, Engine Mechanic, Air Traffic Manager, Pilot, Engine Expert, Airplane Assemblyman—or in any one of forty other highly paid jobs on the ground or in the air.

### Employment Service FREE of Extra Cost

Just as soon as you are trained, my Nation-wide Employment Department will help you find the job you want. This service comes to you absolutely FREE of any extra cost. It's getting results, getting real jobs, for other ambitious men, and can for YOU.

### Save $50 to $450 on Your Flying Time

I've arranged with flying schools all over the country to give special discounts to graduates of my ground school. Often these discounts save you much more than the whole cost of my course! You get a discount check worth actual CASH as soon as you graduate.

### Get the Facts—FREE

Send for my big book of facts about YOUR OPPORTUNITY in Aviation TODAY. It's free—you don't obligate yourself in any way. This book has been the turning point to success for many other fellows—it will show YOU, too, the way to *big success* and *big pay* in Aviation. Just mail that coupon NOW!

## Aviation Institute of U. S. A., Inc.

**WALTER HINTON, Pres.**

**1115 Conn. Ave., N. W. Washington, D. C.**

*Please send me your FREE book, "WINGS OF OPPORTUNITY," showing how I can train at home for a place in Aviation.* 736-H

NAME_____
*Please Print Your Name*

ADDRESS_____ AGE_____
*Please Print* *(Must be 18 or over)*

CITY_____ STATE_____

## Airy Chat

(*Continued from page 60*)

NEW subscribers are coming in all the time, but we wish to mention particularly one of the most distinguished newcomers. This is Mr. Jean De Bassonpierre, now Belgian ambassador to Japan. It is encouraging to feel that Mr. De Bassonpierre and certain officials of our own government, are subscribers and regular readers of POPULAR AVIATION. The application reads as follows:

*On the eve of my departure for Japan, I came across a volume of* POPULAR AVIATION. *I was so much pleased with it that I had made up my mind to tender my subscription to your magazine. I send, herewith, the sum of Y-8.00, the equivalent of $8.50, which is the fee for a year. Please send your numbers to 25 Boulevard Saint Michel, Brussells, Belgium.*

Our foreign subscriptions increase rapidly so that POPULAR AVIATION subscribers are represented on all continents and in most countries. We have a number of regular correspondents in England, Australia, Germany, France and Italy, so that the matter of language seems to have little effect upon our readers.

* * *

CLUBBING together, for the purchase and operation of a glider or plane, is frequently a means of getting flight training at a very reasonable outlay of money, and at the same time, very pleasant personal associations are formed. A proposition of this sort is contained in a letter received from Paul Herman, 45-20 43rd St., Woodside, N. Y.:

*I am an aviator of experience and mechanical graduate of a well-known aviation school. I would like to hear from nine members of the Round Robin Club, mechanics, aviators, or aviatrix, or else some fellows who are interested in learning to fly a glider or plane in New York City or Long Island.*

*We may then buy a glider and start to promote Aviation.*

*I will give them the lessons in return and I would also like to hear from some good aviators or aviatrix,* 18 *years old, who do not have ground training. I will be glad to send them any information about any plane or engine we have in our home study course.*

ALTOGETHER, we have had about two dozen protesting roars of anguish over the conclusion of the Schneider Trophy Race, of which the following contribution is an example. Well, 'stoo bad, but what can we do about it?

The Genesee Valley Model Aircrafters, of Mount Morris, N. Y., lead them all in patriotic fervor. We listen and you tell 'em:

*What's the matter with America? Here the Schneider Cup Trophy has been won by England for the third and last time and we do nothing about it. What's wrong with this country anyway? Not even an entry to try and stop England. What's wrong? Will we have to stay at the bottom of the ladder and look up? That's what we're doing now.*

*England, Italy, France—they're all ahead of us in speed, yet we sit back and seemingly enjoy it. Can't something be done about it? Are we going to sleep and wake up at the next war (it's inevitable and sure to come), and find we're about as slow as snails in comparison with the other world powers? It seems that we're not even trying.*

*Think of the Schneider Trophy race —not even an entry. The other countries openly laugh at our slow old Hawks, Corsairs, Boeings and other planes. Hardly an improvement since the war, except for better motors and possibly a little more speed due to streamlining. But we don't want a little more speed—we want a lot more.*

*The government has control of aviation — it looks like it. Inefficiency. Laird can build faster planes than the government. What's the matter with these birds at Anacostia? Are they all asleep or are they wasting their time trying to improve the N. A. C. A. cowling? It's about time they started earning their salary.*

*The only thing that made me think they were alive was an ad by a model airplane house claiming to have a flying scale model of a new "Navy Fighter." It's supposed to be the answer to the British "Fury," and supposed to go four-fifty. After consideration, I do not even believe that there is a plane of this sort.*

*It seems, that with all the intelligent people there are in our country, we ought to be farther advanced in aviation than any other country in the world. But are we? We are not. We have Fokker, Sikorsky, Laird and fifty-eleven other celebrities that are it in the world of aviation. Yet we don't seem to be getting anywhere.*

*Next month I would like to see an article in your magazine on "What's the matter with America" by some good journalist-aviator. I would like to see him try and wake up these "sleeping beauties" to their senses. I would also like to read a very good review of speed both in and out of our country.*

Attaboy, that's the way to wake 'em up! This is a real tonic to me. We can't print all of the letter by Ralph Pritchard, president of the Aircrafters —it's too long—but we sure wish that you could tune in on some of the mighty interesting suggestions. When it comes to the uplift stuff I can't imagine anyone better qualified for writing a "wake-up" story than Ralph Pritchard himself — why not try it, Ralph?

* * *

AND talk about the next issue—oh, boy! Making a start at the front—with the cover — we are showing a striking view of the new propeller sled in action. And it's not all on the cover, either, for we cover quite a few interesting facts—well illustrated—in the reading columns.

Then, an excellent war story. Next, some very valuable and practical articles on gliders and lightplanes. Then, more dope on engines, and so on.

And so we come to the end of another Airy Chat, the first one of 1932. Happy New Year to you all.

J. B. R.


# GLIDER AND AIRCRAFT SUPPLIES

**Sitka Spruce, the Supreme Aircraft Wood:**

1/4x1/4, 1/4x1/2, 1/2x1/2, 1/4x1/2 (to 6 ft. long), per 100 ft. ..... $2.00
1/4x3/4, 1/2x3/4, 1/2x1 (up to 12 ft. long), per 100 ft. ..... 3.00
1/4x1, 1/2x1, 1/4x1/4 (up to 12 ft. long), per 100 ft. 4.00
1x1, 1x1 1/4, 1x1 1/2 (up to 14 ft. long), per 100 ft. 5.00
(Many other sizes; write for price list)

**Spars:**

1/2x4"x14', each .... $2.50 — 1/4 x4x14' ..... $2.75
1/4 x4 1/2x16', each ... 3.25 — 1/4x4 1/2x16' ..... 3.50
1/4x4 1/2x18', each ..... 4.25

**Plywood:**

1/8" 3-ply Alder, sq. ft. 21c — 1/4" A-N Spec. Birch .. 35c
1/8" A-N Spec. Birch .. 35c — 1/8" Basswood ..... 24c

**Wire, Cable, etc.:**

1/8" 7x7 Flexible, ft ..... 4c
1/4" 7x7 Flexible, ft ..... 5c
1/4" 19-strand, ft ..... 2 1/2c
1/8 and 1/4" Thimbles, each ..... 2c
No. 14 Plated Hard Wire, per 100 ft. ..... $1.00
No. 12 Plated Hard Wire, per 100 ft. ..... 1.25
No. 10 Plated Hard Wire, per 100 ft. ..... 1.50
No. 14 and No. 12 Ferrules, ea. 2 1/2c; No. 10, ea. 3c
1000 lb. Mead "Universal" Turnbuckles, doz. . $1.50
2000 lb. Mead "Universal" Turnbuckles, doz. . 2.00
1 1/4" Aluminum Pulleys, ea. 35c; Housings, ea. 25c

**Tubing, etc.**

Seamless Steel, cold drawn, any gauge, 1/4" to diam., 15c to 20c ft.
Streamlined Steel Tubing, standard sizes, 25c to 40c ft.
A-N Spec. Nickle Steel Bolts, all sizes, 5c to 10c each.
A-N Spec. Nickle Castle Nuts, 2 1/2c each.

**Miscellaneous:**

"Casco" Casein Glue, 60c lb.; Approved 2" Safety-Belts, $2.75 each.
Cement Coated Nails, 1/4" to 1", $1.10 to 60c lb.
Rhon Ranger Fabric, 36" wide, 30c yd. Rib-Lacing Cord, 15c per 100 yds.
1 1/2" Pinked Tape, $2.50 per 100 yds; 2", $3.00 per 100 yds.
700 lb. Tow-Rope, $1.00 per 100 ft; Mead "Duodrop" Release-Hook, $3.50.
Clear Nitrate Dope, 1 gal. $2.00; 5 gals., $8.75.
White Coveralls, embroidered with your insignia in two colors, in lots of 6 or more, $3.50 each.
If it's for a glider or lightplane, we can furnish it. Many items not listed are stocked for immediate shipment, such as glider wheels and tires, aircraft lacquers, shock-cord, etc. Ribs built to any air foil at moderate cost.

TERMS: Cash with order, or 50 per cent cash and balance C. O. D. Prices are F. O. B. Chicago. Packing charge, 5c per foot on longest item in shipment.

***10% Discount on Orders Amounting to $25.00 - $50.00***
***15% " " " " $50.00 or more***

**DON'T GAMBLE WITH QUALITY!.....**
**Only the BEST is GOOD ENOUGH!**
***Order from MEAD and be SURE of satisfaction***

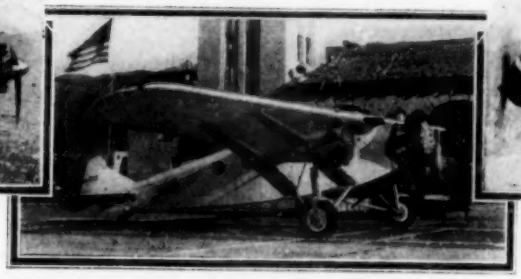
# MEAD GLIDERS

**Dept. F-12 - 12 S. Market Street - Chicago Illinois**


XUM

# Only at RYAN

## can you attend a school *with ALL these advantages!*



### *Outstanding Features of Ryan Transport Training*

1. Tri-motor flying time.
2. Blind Flying Course in Hooded Cockpit.
3. Plenty of night flying.
4. 3500 miles of cross-country over mountains, desert, ocean shore and fertile valleys.
5. All flight instruction in most modern air-cooled equipment featuring the famous 1931 Great Lakes—holder of the world's record for outside loops.
6. Extensive five-place cabin ship training in Ryan Broughams and Fairchilds
7. Use of parachutes for all flight training.
8. A Ground School Course that is unusually thoro, exceeding minimum Government requirements by more than 200%.
9. Full Government Transport Approval.
10. Present Ryan tuition rates establish new low costs for Government Approved training.
11. Free transportation to San Diego—see special offer.
12. All training in San Diego California—recognized thruout the world for its ideal year 'round climate. . . . . Remember this city has no snow, sleet or other disagreeable features of winter flying. Train under the blue skies and warm breezes of this enchanting land. Benefit by contacts at San Diego with the U. S. Government's largest aeronautical operating base.

*EVERY PERSON* with vision knows that aviation is destined to be one of the greatest of industries . . . its rapid growth will continually unfold innumerable opportunities for those who seriously prepare now.

*WITH A FOUNDATION* of sound *Ryan* training you too can take your place in this new industry of opportunity.

The T. C. Ryan Flying School—one of the oldest in the United States—is proud of its position of leadership in the quality and completeness of its courses. Under the personal direction of *T. Claude Ryan*, pioneer and expert airman, manufacturer and aviation training authority, the T. C. Ryan Flying School is an internationally recognized school.

Why not give yourself the best —*its the wisest investment*—and it costs no more!

*RYAN* Graduates enjoy recognition and distinction; many of the world's foremost pilots received their start at this School.

*RYAN* invites inquiries about particular courses by those seriously interested.

### Lowest Rates in History

*NOW IN EFFECT . . . . at RYAN*

(1) TRANSPORT COURSE *with Ground School* . . $2,675

(2) TRANSPORT COURSE *without Ground School* $2,535

(3) LIMITED COMMERCIAL *with Ground School* . . . $785

(4) LIMITED COMMERCIAL *without Ground School* . $645

(5) PRIVATE COURSE *with Ground School* . . . $325

(6) PRIVATE COURSE *without Ground School* . $250

(7) REFRESHER COURSES *Prices on request*

(8) MASTER GROUND COURSE, *4 months* . . . . . $175

(9) For the sportsman pilot, *or the student who wishes to insure his immediate commercial activities after graduation*, the Ryan Flying School continues its deluxe combination offer of transport instruction (*same as Course 1*) plus new 1931 Great Lakes plane.

Combination Price, only . . . . . $3,985

### A Free Trip to San Diego, California

Ryan Transport students enrolling for *Course 1, 2 or 9* while this offer is in effect, will be allowed free first-class railroad transportation from their home in the United States to San Diego.

Ryan Limited Commercial students enrolling for *Course 3, 4 or 9*, while this offer is in effect, will be allowed one-half the charge for first-class railroad transportation to San Diego.

*Fly and spend the winter in California—at less cost than if you stayed at home!*

THIS OFFER SUBJECT TO CANCELLATION WITHOUT PREVIOUS NOTICE.

*Name* ---------- *Street, City and State* ---------- *Age* ----------

☐ CHECK HERE For further information about the RYAN "Training—plus Plane" $3,985 Course.

☐ CHECK HERE For information regarding Transport, Limited Commercial and Private Flying or the Master Mechanic's Ground Course. *(Underline which.)*

## at the T.C. RYAN U. S. GOV'T APPROVED *Transport* FLYING SCHOOL

IN SUNNY SAN DIEGO, CALIFORNIA

# OWN America's Most Popular Sport Plane!

HERE is a real ship for you! New throughout, but designed and built with *HEATH'S* knowledge of *your* needs in a light sport plane.

This splendid new plane has a genuine top speed of 80 M. P. H. and sits down easily and safely at 30 M. P. H. Its stability and visibility make it perfect for novice pilots, while its pep and maneuverability amaze men of long flying experience.

You can own this fine new HEATH in several ways. Buy it ready to fly for $1074 at Niles; assemble it yourself from factory built parts easily for $549, less power plant; or build it from the ground up from HEATH'S quality blueprints and complete instructions and materials for only $269, less power plant.

## HEATH AIRCRAFT CORPORATION

*Dept. R-21*

**NILES, MICHIGAN**

***Send 15c for complete information, including motor prices, terms, etc.***

# BUSINESS-VALUE $ $ $ $

## IS THE MEASURE OF YOUR IMPORTANCE IN AVIATION

***IF you're going to the top in Aviation, you must be able to deal with flying as a BUSINESS . . . as a major factor in the transportation industry.*** **If you're going to the top in any other branch of today's affairs, sooner or later you'll have to reckon with the airplane as an element of your world. Aviation touches all businesses . . . forms, month by month, a more vital contact with every industry. For transportation is the life-blood of commerce and the air is the twentieth century's own transportation channel.**

# FLYING *EXECUTIVE* or EXECUTIVE *FLYER*

## YOU MAY BE EITHER!

THE business leader of tomorrow will be a man who knows Aviation. Visualizing that requirement, PARKS AIR COLLEGE offers you today's only course of training designed to that end. The Executive Transport Pilot's Course is a 19-month job . . . equivalent in its field to 4 years of college work for other professions. It gives *more* than the technical requirements for the Transport license . . . and beyond that, the special 28 weeks of executive training in air-transportation as a business.

### Super-Training for Super-Flyers

This course embraces Air Transport Operation, Operations Management, Personnel Selection, Economics of Air Line Location, Airport Design and Management, Advanced Aeronautical Meteorology, Public Speaking, Engineering Drawing of Airplane Structure, Advanced Navigation of Aircraft, Salesmanship, Sales Promotion, Advertising, Aircraft Radio Equipment. The successful graduate leaves this course with a long start toward his goal. From among such men, tomorrow's leaders in Aviation are sure to be chosen. Will you be one of them?

**It is important that you get full information at once. The coupon below will bring it.**

### PARKS *Executive* Transport Pilot's Course

***First Semester:*** **11 weeks' Transport Pilot's Ground School; 50 hours flying; qualifies for Limited Commercial Pilot's License.** ***Second Semester:*** **30 weeks' Airplane and Engine Mechanic's School. 45 hours' flying.** ***Third Semester:*** **28 weeks' Executive Business Course. 125 hours' advanced flight, including night, cross-country and blind flying, and work on Lockheeds and other 5000-lb. cabin ships. Vacation periods between semesters.**

**PARKS AIR COLLEGE**
WORLD'S LARGEST COMMERCIAL FLYING SCHOOL

**SECTION 1-PA** **EAST ST. LOUIS, ILL.**

**Send me full data on the Executive Transport Pilot's Course. I am interested in Aviation as a factor in my business future.**

**Name** _____

**Address** _____

**City** _____ **State** _____

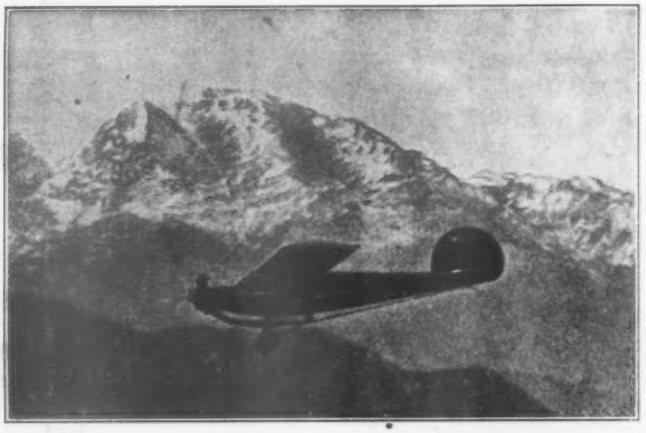
**Age** _____ **Occupation** _____

XUM

# Sheer Pleasure

## AT A *Profit*

*Government licensed*



# THE ALEXANDER FLYABOUT

**2-seater HEATED cabin monoplanes**

Flyabout flying not only is delightful relaxation but a source of steady income. Earn an independent living while soaring far above mundane monotonies. Combine a remunerative business with the enjoyment of owning a Flyabout that flies itself. Flyabouts land leisurely. They are difficult to stall. They may be used on extremely small fields. They cost less to run than a light car. And they are YEAR-AROUND airplanes.

**Your Flyabout is a Money-Earner**

Allow us to show you how you can pay for your Flyabout quickly and easily in a new and novel manner. And let us refer you to many well-satisfied owners. We only echo their enthusiasm.

## WRITE TODAY

**$1465**
**Continental Motor**
*Approved Type Certificate No. 439*

ALEXANDER AIRCRAFT CO.
Room 223
Colorado Springs, Colorado

**$1590**
**Szekely Motor**
*Approved Type Certificate No. 449*

**Still Building the Popular EAGLEROCK Biplane After Five Years**

XUM

XUM